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UNIVERSIDADE DO PORTO

Eco-conscious message in a bottle.

Post consumer PET plastic bottles upcycling
into jewellery design in a Porto context.

Lina Bitkeviciute

Submitted in fulfilment of the requirements
for the degree of Master of Image Design

Supervisor: Susana Barreto

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Acknowledgements

This dissertation is a milestone in my personal, academic and professional life. Therefore, I would like to express an immense gratitude for all those who have supported this great journey of my invention.

Firstly, I would like to express my deepest gratitude to the study supervisor, Dr. Susana Barreto for her contribution, support and useful advises throughout the whole process.

I would also like to thank the following people: Ms Fabiana Gadano, Ms Sonya Sanchez Arias and Ms Aurora Robson who kindly accepted my interviews.

Finally, it is needless to say that I dedicate this dissertation to my family and companion whose love has turned me into a happy person, who follows her dreams.

Abstract

This research project, titled “Eco-conscious message in a bottle”, is an investigation of post- consumer Polyethylene terephthalate (PET) plastic bottles upcycling into jewellery design in a Porto context. The researcher tries to share a positive message and as a designer to exemplify her commitment to the contemporary social and environmental concerns such as low levels of plastic recycling. Also, she shows relationship between design and matter with the hope of inspiring this dynamic understanding of sustainability.

Firstly, this research project aims to reveal how thinking through material can be incorporated into a practice-led design research. Secondly, it presents and examines a position of the creative processes and their outputs in the research.

Furthermore, the study employes a qualitative research strategy, with case study principles. Semi-structured interviews and focus group interview methods were used to collect data. The intention of the research project is not to arrive at a single solution that will draw out of the unsustainable reality of PET plastic. Instead, this is the thoughtful journey of one designer longing to discover what new dialogue could be found between design and matter.

Finally, this research project seeks to communicate with a focus group of design students in the Faculty of Arts of the Porto University and to encourage them to consider the possibility of using these materials that are usually thrown out and have responsibility for their own waste. Also, by presenting jewellery made from post- consumer PET plastic bottles it hopefully transforms an attitude to think about the message behind the project.

Keywords*: Sustainability, Design, Activism, PET bottle, Upcycling, Environmental consciousness.*

Resumo

"Consciência ecológica, mensagem numa garrafa" é o título deste projeto de investigação que pretende refletir no pós-consumo de garrafas de plástico em material tereftalato de polietileno. Através da sua reutilização, pretendemos transformá-lo em objetos de joalharia no contexto da cidade do Porto.

Na condição de designer, o investigador esforça-se por passar uma mensagem que reflita sobre as questões sociais e do ambiente, comprometendo-se a analisar os baixos índices de reciclagem do plástico. A relação entre o design e a matéria, pressupõe o entendimento da dinâmica das práticas sustentáveis.

Inicialmente, esta investigação tem como objetivo incorporar práticas de design que se desenvolvam a partir do pensamento sobre a matéria.

De seguida, apresentamos e analisamos os processos criativos e consequentes resultados.

Além disso, o estudo recorreu a uma estratégia de pesquisa qualitativa, através da análise de estudos de caso realizados com entrevistas semi-estruturadas e reunião de dados provenientes do grupo de amostra investigado. O propósito desta investigação passa, sobretudo, pela procura de novos métodos de cooperação entre o design e a matéria, no sentido de criar soluções para ultrapar o problema de sustentabilidade do tereftalato de polietileno.

Por último, esta investigação questiona um grupo de estudantes da Faculdade de Belas Artes, Universidade do Porto, sobre o uso deste material, alertando para um sentido de responsabilidade social para com o ambiente.

Esperamos que criar joalharia a partir de garrafas de plástico, conduza à reflexão da mensagem implicita neste projeto de investigação.

Palavras-Chave: *Sustentabilidade, Design, Ativismo, Garrafa de tereftalato de polietileno, Reutilização, Consciência ambiental.*

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List of Acronyms

APA – American Psychological Association.

C2C – Cradle to Cradle.

DfD – Design for Disassembly.

DfE – Design for Environment.

DfS – Design for Sustainability.

EPEA – Environmental Protection Encouragement Agency.

EU – European Union.

FBAUP – Faculty of Fine Arts, University of Porto.

IIED – Institute for Environment and Development.

PET – Polyethylene Terephthalate.

PC – Personal Computer.

SD – Sustainable Development.

DfS – Design for Sustainability.

TBL – Triple Bottom Line.

TED – Technology Entertainment Design.

UN – United Nations.

UNCED – United Nations Conference on Environment and Development.

UNCSD – United Nations Conference on Sustainable Development.

UN DESA – United Nations Department of Economic and Social Affairs.

UNEP – United Nations Environment Programme.

WCED – World Commission on Environment and Development.

WSSD – World Summit on Sustainable Development.

Glossary

Cradle to Cradle (C2C): This term refers to a holistic economic, industrial and social framework which seeks to create systems that are not just efficient but essentially waste free (McDonough & Braungart, 2002).

Downcycling: Refers to the waste stream; to create a new material that has inferior qualities to the original material.[1]

Design for Sustainability (DfS): Design that considers the environmental (for example resource used, end of life impact) and social impact of a product (for example usability, responsible use) (Bhamra & Lofthouse, 2007).

Eco-design: A design process that considers the environmental impacts associated with a product throughout its entire life from acquisition of raw materials through production/ manufacturing and use to end of life. At the same time as reducing environmental impacts, eco-design seeks to improve the aesthetic and functional aspects of the product with due considerations to social and ethical needs. Eco-design is synonymous with the terms of Design for Environment (DfE) (Fuad-Luke, 2002, p.339).

Gaia: A hypothesis proposing that the biosphere and the physical elements of the Earth are closely integrated to form a complex interacting system. According to the hypothesis of James Lovelock, the Earth works as a single, self-regulating living organism or a closed system (Lovelock, 2009).

Green design: A design process which focuses on assessing and dealing with a product's individual environmental impacts rather than on the product's entire life. (Fuad-Luke, 2002, p.340)

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[1] The definition that does not include a quote is by the researcher.

Reclamation: A process when product which already served its purpose is transformed from loss or from a less useful condition.[2]

Recycle: describes the process of using item which no longer is useful and turning it into a new product of the same quality level as the original product (McDonough & Braungart, 2002, p. 56).

Reuse: To reuse is to use an item more than once. This includes conventional reuse where the item is used again for the same function and new-life reuse where it is used for a new function. By taking useful products and exchanging them, without reprocessing.[3]

Sustainability: Considered to be more of a direction than a destination that we will actually reach (Bhamra & Lofthouse, 2007).

Sustainable: An adjective applied to diverse subjects including populations, cities, development, businesses, communities and habitats; it means that the subject can persist a long time into the future (Fuad-Luke, 2002, p.341).

Sustainable Design: Theories and practices for design that cultivate ecological, economic and cultural conditions that will support human well-being indefinitely (Thorpe, 2007, p. 13).

Sustainable development (SD): As the Brundtland Report states, the development that meets the needs of the present without compromising the ability for future generations to meet their own needs. The term contains within two following key concepts: the concept of "needs," in particular the essential needs of the world's poverty, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization to the environment's ability to meet present and future needs. (Fuad-Luke, 2002, p.341)

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[2] The definition that does not include a quote is by the researcher.
[3] The definition that does not include a quote is by the researcher.

Sustainable Product Design (SPD): A design philosophy and practice, in which products contribute to social and economic well-being, have negligible impacts on the environment and can be produced from a sustainable resource base. It not only embodies the practice of eco-design, with due attention to environmental, ethical and social factors, but also includes economic considerations and assessments of resource availability in relation to sustainable production. (Fuad-Luke, 2002, p.341)

Upcycling: The practice of taking something that is disposable and transforming it into something of greater use and value (McDonough & Braungart, 2002).

Chapter 1

1 Introduction

"Without reflection there is no consciousness, without consciousness there is no progress" Anon.,Greek (Cooper T., p. 134, 2010).

This research project focuses on the upcycling of plastic post-consumers PET plastic bottles (Figure 1). A researcher tries to implement her point of view in regards of awareness about low levels of plastic recycling by implementing the presentation of the jewellery made from post-consumer Polyethylene terephthalate (PET) plastic bottles. It shows relationship between design and matter with the hope of inspiring this dynamic understanding of sustainability. Moreover, it seeks to enhance the environment by influencing towards conservation of resources through imaginative and inspirational design and find a way of how to send the message to the focus group of design students in the Faculty of Arts of the Porto University that reinforce awareness of sustainability could change focus group behaviour, consciousness and lead them to an effective change-process.

Firstly, this research project aims to reveal how thinking through material can be incorporated into a practice-led design research. Secondly, it will present and examine a position of the creative processes and their outputs in the research.

Further, the intention of the research project is not to arrive at a single solution that will draw out of the unsustainable reality of PET plastic. Instead this is the thoughtful journey of one designer longing to discover what new dialogue could be found between design and matter.

In the period between the 17th and 19th century the Western industrial revolution drew into increasing growth of the energy in fossil fuels demand. Moreover, the modern sanitation systems and the advanced medicine have been protecting large populations from various diseases (Hilgenkamp, K., 2005). According to the United Nations, "World's Population Prospects: The 2012 Revision", the world's population has been significantly increasing over the recent decades. On the 1st of July, 2012 there have been 7.1 billion inhabitants calculated, 7.2 billion in mid-2013

and by the year of 2025 the figures are expected to raise up to 8.1 billion people (medium variant, 2012 Revision) (UN DESA, 2013).

The growth of human population, rapid urbanization, expanding global economy, and the diffusion of Western consumer lifestyles are placing increasing pressure on natural and social systems. Furthermore, manufacturing and consumption have become weighty public concerns in recent decades, largely due to resource-intensive production processes and mounting landfill waste (McDonough & Braungart 2002; Thorpe 2007, p. 27).

The world's biggest consumers, mostly in West and Japan, have a desire for the next best thing (Dormer, 1991). Also, Tim Jackson, British ecological economist and professor has noticed: "People are being persuaded to spend money we don't have, on things we don't need, to create impressions that won't last, on people we don't care about" (Jackson, 2010). As a result, a growing number of population and overconsumption causes the need of more material and food production, which also leads to more waste. Since each of us acts to reach their paradigm of wellbeing and happiness, environmental sustainability lies on a personal level (Jackson, 2010).

Waste management is arguably the foremost environmental challenge facing our generation. It has been estimated that the global production of plastics increased by 15 million tons (6%) to 265 million tons from 2009 to 2010, this means that plastic production has grown up to 5% per year over the past 20 years (UNEP, 2011). In addition, 10% of the plastic produced every year worldwide winds up in the ocean and 70% of it has sat down on the ocean floor and most likely will never degrade (UN, 2006).

The consumption of plastic has significantly grown all over the world and, consequently, created a gigantic amount of plastic-based waste. Unfortunately, the properties of producing plastic are not only making it so valuable but also creating its disposal problematic due to its durability, light weight and low cost. Plastic waste creates serious environmental problems especially with a modern living consumption and a low recycling rate. According to Magrinho, Didelet and Semião (2006), in Portugal, post-consumer packaging accounts for almost 40% of total domestic waste. Moreover, in a usual Portugal municipality about 10-14% of all generated waste is plastic. However, plastic waste cannot be dumped in landfills because of its bulk and slow degradation rate.

From the environmental perspective, the human paradigm of wellbeing and happiness challenge the design's contemporary role. Design thinking can try help to lower the recycling rates and try to reduce a negative impact from waste to environment.

In a summary, the researcher tries to share positive message and as a designer to exemplify her commitment to contemporary social and environmental concerns. What's more, this research project seeks to communicate with a focus group of design students in the Faculty of Arts of the Porto University and to consider the possibility of using these materials that are usually thrown out and have responsibility for their own waste. Also, by presenting jewellery made from post-consumer PET plastic bottles it hopefully transforms an attitude to think about the message behind the project.

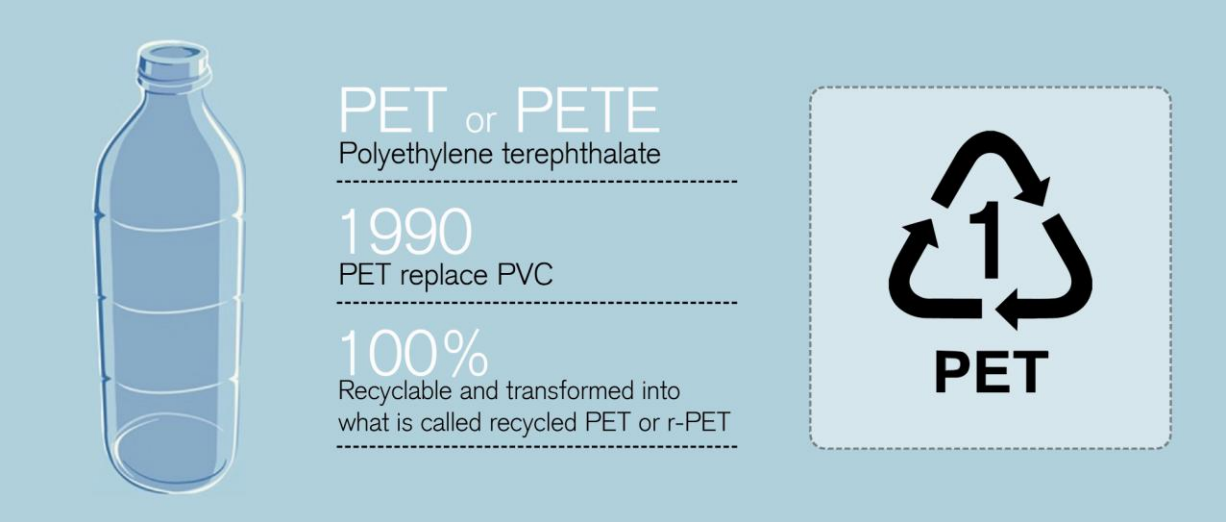

Figure 1: *Polyethylene terephthalate (Bitkeviciute, 2012).*

1.1 Aims and Objectives

This research project aim is to develop and manage a project raising awareness about low levels of plastic recycling by implementing the presentation of the jewellery made from post-consumer PET plastic bottles. Besides that it tries to exemplify commitment to contemporary social and environmental concerns and share positive message from the point of view of designer to target group.

This project aims to develop an appropriate technology which will permit them to upcycle plastic bottles into jewellery.

In this research project, the following aims will be highlighted:

– To bridge the gap between professional and personal value systems, for a more holistic and embodied engagement with the sustainability imperative.

– Send positive message to target group.

– Create jewellery from post-consumer PET plastic bottles.

– Create a synergy within other creators.

In this research project, the following objectives will be emphasized:

– To analyse theoretical debate related to the research project.

– To offer a framework for opportunity focused and imaginative explorations of sustainability.

– To explore the work of contemporary artists and designers who are currently working with PET plastic bottles and considering implementing sustainability into their work. Also, to explore in what ways are they sourcing their materials, developing their making and production processes, incorporating "Reduce, Reuse and Recycling" strategies into projects, adopting "upcycling" schemes, extending product life, and/or creating activist initiatives around their practices.

– To create and develop a device which could rapidly shred PET bottles into ribbons.

– To create this topic related site (blog).

– To conduct qualitative interviews, in order to obtain experts' opinions about the topic and also to add critical aspects.

– To conduct focus group discussion, in order to obtain to learn more about opinions on a designated topic in an informal setting.

– To create a designed jewellery- necklaces system from a post- consumer PET bottles stripes, with a support from an artist book called "Eco-conscious message in a bottle".

1.2 Research question

This research study is seeking to send a message that reinforce awareness of sustainability to the focus group of design students in Faculty of Arts of the Porto University, implementing the presentation of the jewellery made from post-consumer PET plastic bottles. It is also seeking to find a way of how it could create consciousness and lead them to an effective change-process.

What's more, tries a role as a designer to enhance the environment by influencing the public towards conservation of resources through imaginative and inspirational design

This aim will explore a series of more specific, sustainability related questions. They are as follows:

RQ1*:* How can jewellery made from post-consumer PET plastic bottles reinforce awareness of sustainability in a Porto context?

RQ2*:* How can jewellery made from post-consumer PET plastic bottles create consciousness?

RQ3*:* Can design- led upcycling affect focus group of design students in Faculty of Arts of the Porto University behaviour and lead to a process of effective change?

RQ4: Can design led upcycling of post-consumer PET bottles raise a concern about the environmental sustainability issues on a personal level through work?

RQ5: Can post-consumer PET plastic bottles be turned back from waste to a useful, desirable and pleasing object and challenge expectations?

Answering the questions above has been a great challenge which will be explained in the conclusion. In addition, it has envisioned how communication could be put to work in Western cultures.

1.3 Background and motivation

Since 2009 I have been experimenting with waste materials, such as recycled PET bottles, magazines, paper, cork, fabric, old buttons, zippers and cans. These supplies have always been a part of my produced jewellery and home decoration accessories (Figure 2, 3). In 2010 I started writing my blog: http://saltareli.blogspot.com where I am publishing my work in recycling theme.

My commitment to "reuse" consumer waste started from a sense of social responsibility. The issue of sustainability and care for the environment is extremely essential for me.

Firstly, this topic is environmentally significant worldwide at the present. Secondly, my professional conscience encouraged me to focus on this subject. It feels contradictory that plastic bottles are meant to be friendlier to the nature yet can actually harm it if it is not recycled (plastic is lighter than glass, so it costs less and requires less fuel to transport). Even though plastic has its positive properties it is negatively valued because of its resources. I feel a personal responsibility for the state of nature and I would like to be involved in preserving our environment.

Figure 2, 3: *"Ecotique line" (Bitkeviciute, 2012).*

1.4 Structure of Thesis

The research project is written as a scholarly work therefore it relates the academic writing guidelines to a responsible research practice. This study is divided into five different chapters. The structure consists of the objectives of this study and the chosen research strategy.

Chapter 1: Introduction – defines the research project focus, contextualizes the research and identifies the research objectives.

Chapter 2: Conceptual Background and Literature Review - discusses relevant fields and studies, sets the conceptual background for the research. The subchapters divide the literature review into four sections. The first section (Chapter 2.1) defines sustainability and sustainable development (SD) concepts and introduces the concept of sustainability and SD in the global perspective and changes of designer's attitude towards sustainability 1950 – Present. The next section (Chapter 2.2) defines one point of view behind the green design to reclaimed and recycled design. Following, Chapter 2.3 introduces definitions of metadesign. The last section focuses on the craftivism (Chapter 2.4). Chapter 2.5 provides the reflections on the Literature review.

Chapter 3: Methodology – discusses the methods and procedures employed in the study. It justifies chosen approach method, describes the measurement of attitudes and outlines the primary and secondary data collection and data analysis of the quantitative methods used.

Chapter 4: Project “Eco-conscious message in a bottle”.

Chapter 5: Draws together the conclusions and a discussion of the main findings from the study into a wider context. Also, it provides practical recommendations for action, describes the contribution of this study, recommends fields for further research and outlines the limitations of the research

It will be finalised with a list of References and Appendixes.

Chapter 2

2 Literature review

2.1 Sustainability

Sustainability is a systemic concept, related to the interconnectedness of economic, social, and environmental aspects of society. The term "sustainability" is as a more restricted concept of "sustainable development" (SD). It is closely linked with the idea of intergenerational equity through the preservation of the environment or "ability to sustain", leaving aside subjective social constructs around the questions of what exactly human development constitutes (Manderson, 2006). In this sense, sustainability may be understood as a synonym of "environmental sustainability".

Another well-known and very accepted definition of sustainability is the triple bottom line (TBL) (see Figure 3) which is also known as 3BL; People, Planet, Profit (the 3Ps); and Ecology, Economy, Equity (the 3Es). The expression of "TBL" was firstly coined by John Elkington in 1994, with an expansion in his book "Cannibals with forks: the Triple Bottom Line of 21st Century Business" (1998) where he referred to sustainability as practice measured in terms of social, economic and environmental performance (Jedlicka, 2010). For the purpose of this research project, the term sustainable practice will refer to the social and environmental aspects of sustainability.

Moreover, it is essential to mention the scepticism about SD. The Gaia theory (Lovelock 1992; 2006) provides a pioneering and widely influential meta-theory of interdependence that expands upon SD approach. In essence of a hypothesis, "…not only is life a planetary phenomenon, but the material environment of life on Earth is in part a biological construction" (Thompson 2007, p.119). According to James Lovelock (1992; 2006), developer of the Gaia theory in which describes the Earth as a single organism it is too late for SD; environment was damaged beyond its limits; industrialization made its worst effects (Chick & Micklethwaite, 2011).

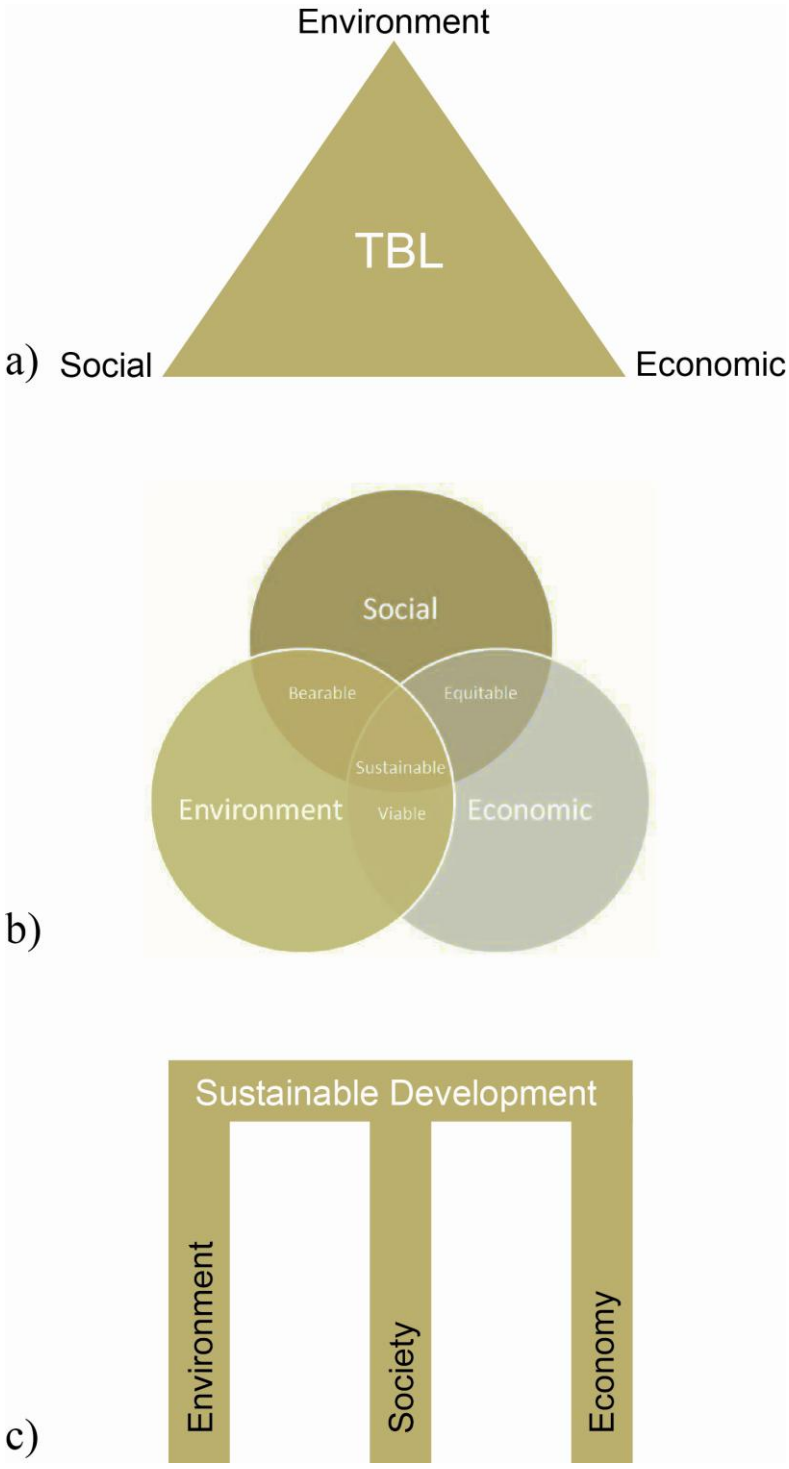

Figure 4: *a) Triple bottom line (Elkington, 1998); b) The overlapping circles model of SD (Chick & Micklethwaite, 2011, p. 83); c) Three pillars of sustainability (Chick & Micklethwaite, 2011, p. 82).*

Hence, sustainability has many contradictive definitions. For instance, deep ecologists would not agree with equality between other life forms. According to Chick and Micklethwaite (2011), the SD is "anthropocentric" human cantered concept. Therefore, anthropocentrism is the main cause of problems created by human interaction to the environment. It aims to avoid merely anthropocentric environmentalism, which is concerned with conservation of the environment only for exploitation by and for humans' purposes, which rejects the fundamental philosophy of deep ecology[4].

Furthermore, Sustainable development (SD) is one of the main challenges of the 21st century, because it is threatening all areas of human activity (Fuad-Luke, 2009). However, sustainable development is related to a join effort carried out between different areas, including economy, sociology, ecology and politology. Thus it is trying to strike a balance between economic growth, social equality and the preservation of natural resources and habitats.

2.1.1 The global perspective of Sustainability

The concept of sustainability can be dated back to the mid-1970s when Barbara Ward and the Institute for Environment and Development (IIED) first used Sustainable development (SD) concept (Chick & Micklethwaite, 2011) which gained its importance in the 1987 UN's Brundtland Report, entitled "Our Common Future" (WCED, 1987, p. 8) where it was described as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Bridges & Wilhelm, 2008, p. 34). It highlights a progressive transformation in the fields of economy and society, relating the frameworks of Earth's Ecosystems protection.

Although, the key stage for the Sustainability were the 1992 Earth Summit with the development of the personal computer and the Internet (Edwards, 2005). The adoption of the Brundtland Report in 1987 led to the development of Agenda 21, adopted at the 1992 June. The UNCED Earth Summit declaration (Principle 3) states the following: "… the right to development must be fulfilled so as to equitably meet developmental and environmental needs of

[4] The term deep ecology was coined by Arne Naess in his 1973 article,"The Shallow and the Deep, Long-Range Ecology Movements". The central idea of Deep Ecology is that we are part of the earth, rather than apart and separate from it.

present and future generations" (UNCED, 1992). For the first time the world has had a reasonably well-established document that ratified extreme measures to counter the alarming growth of global warming.

Moreover, Agenda 21 has specified three following dimensions that support any kind of SD: environmental, social and economic ones. This marks a significant concern of the economic, environmental and social objectives integration towards a SD or sustainability in the very early stage. Furthermore, this provided an opportunity for "culture of sustainability" (Margolin 1998, p. 85). In another words, individuals and groups worldwide had a set of principles to work with and a base for developing strategies for a change (Margolin, 1998). It turned into a stimulated discussion about the longevity in the context of sustainable design.

In addition, in 1992 William McDonough Architects and the Environmental Protection Encouragement Agency (EPEA) developed the Hannover Principles for the 2000 World's Fair, where DfS was mentioned in its early stages (Newman, 2011). "The Hannover Principles: DfS", has become a guide of sustainable design standards worldwide. Moreover, Principle Six states that "Eliminate the concept of waste" was a radical new concept (McDonough & Braungart, 2003, p.1).

Adding, Kyoto Protocol of 1997 (UN), which came into force in February 2007, is also a significant point in the development of thinking on sustainable development. This report also gives six important themes which can be seen as problem areas suitable for design activity: "quality of life, efficient use of natural resources, protecting the global commons, managing human settlements, the use of chemicals and the management of human and industrial waste, and fostering sustainable economic growth on a global scale" (Margolin, 1998).

Finally, there has been a substantial growth in expertise in this field after The World Summit on Sustainable Development (WSSD) in 2002. This development promoted greater awareness of sustainable production and consumption. Correspondingly, "there has been a substantial growth in expertise in this field: networks and conferences link together hundreds, if not thousands, of researchers with the aim of developing the knowledge and evidence necessary to underpin appropriate government policies" (Cooper, 2010, p. xx).

2.1.2 The evolution of the concept and designer's attitude towards sustainability in design

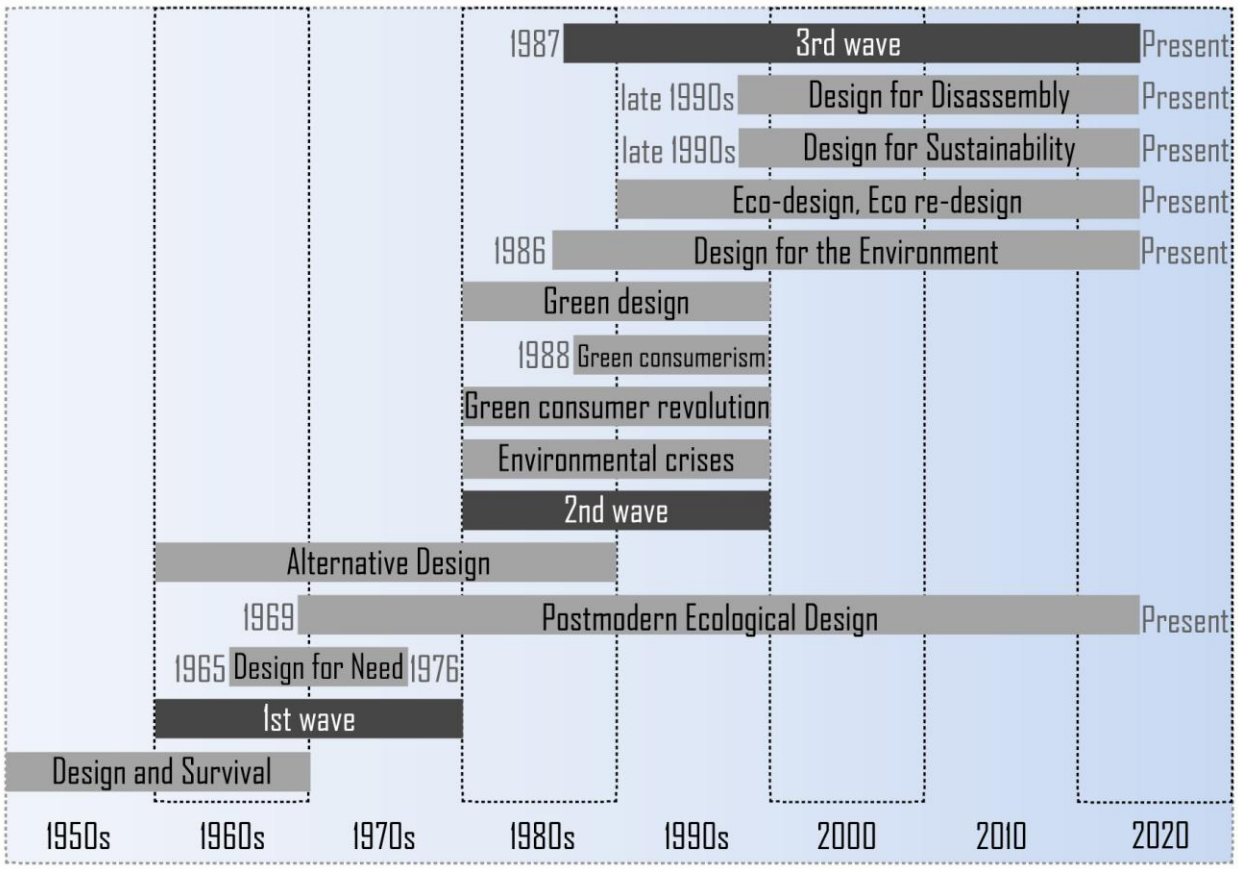

Figure 5: *Historical roots of changes of designer's attitude towards sustainability 1950s – Present* [5] *(Bitkeviciute, 2013). Adopted from: Design and survival (McDermott, 2007); 1st wave (Bhamra & Lofthouse, 2007; Knight et al., 2009); Design for Need 1965-1976 (McDermott, 2007;Fuad-Luke, 2009, p.210); Postmodern Ecological Design 1969- present (Fuad-Luke, 2009, p.211); Alternative Design (McDermott, 2007; Fuad-Luke, 2009); 2nd wave (Bhamra & Lofthouse, 2007; Knight et al., 2009; Magde (1997); Environmental crisis (Knight et al., 2009); Green consumer revolution (Bhamra & Lofthouse 2007); Green Design (Whiteley, 1993); Design for the Environment 1986-present (Fuad-Luke, 2009, p.212);Eco-design, Eco re-design (Magde, 1997); Design for Sustainability late 1990-present (Bhamra & Lofthouse, 2007);Design for Disassembly (McDermott, 2007); 3rd wave (Magde, 1997;Bhamra & Lofthouse, 2007; Knight et al., 2009).*

[5] Last edited August 15, 2013.

In this next section, it will be presented the development of sustainable design in a historical context and how shifts in awareness have changed both the designer's and public's.

The roots of environmental concerns into the design of artefacts and the built world have covered far more than a few broad ideas concerning our relationship with the natural word. The first tentative steps can be dated in the late Victorian cultural and political landscape of England, by modern environmentalists such as John Ruskin (1819-1900) and William Morris (1834 -1896) who did not support consumerism, pollution and other actions that were harmful to the natural world. Further, debate about socially responsible design can be dated back to John Ruskin, William Morris and designer-makers of the Arts & Crafts movement with philosophical notions of "joy of making" with your own hands also "truth of materials" ant "honest workmanship" (Whiteley, 1993, 92; Woodham, 1997, p. 227).

Moreover, the earlier concerns related with nature were expressed by ecologist such as Aldo Leopold (1949) with "land ethic". Aldo Leopold (1949) saw that treating the natural world with love and respect would be difficult unless people found ways to stay connected to the natural world.

According to Magde (1997), Bhamra and Lofthouse (2007) the evolution of sustainability can be divided into 3 waves (Figure 5). The 1st wave emerged in 1960s and 1970s with birth of the Green Moments and a rise of the Non-Governmental Organization [6] (Bhamra & Lofthouse, 2007). At the same time, during the era of growing consumption in Western industrialized world, public discussion emerged surrounding product longevity and an intense but short-term fashion, whereas ideas associated with ecology, resource management, and environmentalism.

During 1960s, it was time of activism and experimentation in design. Although, in the late 1960s it was developed as a socially led approach to design- Design for Need [7] and Alternative design (McDermott, 2007; Fuad-Luke, 2009, p.210). The oil crisis was initially a radical movement, which drove the producers to examine the entire life cycle of products. Simultaneously, in this era designers were experimenting with new forms by using recycled

[6] Such as the Club of Rome in 1968, the U.S. Environmental Protection Agency in 1970, Friends of the Earth in Europe and Greenpeace in Canada in 1971.

[7] It was a movement arguing for a fair and equitable distribution of resources across the world, but its success has been limited (McDermott, 2007, p. 75).

materials and examining alternative design[8], production and sales systems (Whiteley, 1993). Important was a hippie movement, which presented its concerns about consumerism, wastefulness of society and showed more profound relationship with the land. They oppose economic concepts such as "planned obsolescence" [9]and the exploitation of natural resources (McDermott, 2007). Also like a hippie movement, inventor and futurist R. Buckminster Fuller, articulated idea of particular reference to energy since the late 1930s (and up to 1980s) (Woodham, 1997). Fuller developed several products, concepts and theories that advocate a more efficient use of recourses[10] [11]. During this decade designers began actively consider wider implications of design for society (Wood, 2007; Bhamra & Lofthouse, 2007). Fuller presented several ideas of compassionate, problem solving, anti-consumerist design, for example: wind-power equipment, geodesic domes and temporary shelters from cardboard for use in disaster areas.

During the 1st wave, a small but well-known group of insiders engaged in a serious soul-searching, questioning established practice in the design profession. The concept of design for sustainability first emerged in the 1960s when first pioneers like Vance Packard, in "The Waste Makers" of 1960, R. Buckminster Fuller, in "Operating Manual for Spaceship Earth" of 1969, Victor Papanek, in "Design for the real world: human ecology and social change" of 1971, Ernst Friedrich Schumacher, in "Small is Beautiful" of 1973 and Gui Bonsiepe (1973) began to criticize modern and unsustainable development and suggest alternatives. Writers such as Vance Packard and Ralph Nader started a critique about industrialization and consumerist culture. Adding, Packard expressed a concern about environmental implications of planned obsolescence for resource use and waste.

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[8] Alternative design is now subsumed into the wider remit of sustainable design, and therefore "alternative" is today part of mainstream design (McDermott, 2007, p. 8).

[9] Planned obsolescence in industrial design is a policy of planning or designing a product with a limited useful life, so it will become obsolete, that is, unfashionable or no longer functional after a certain period of time (McDermott, 2007).

[10] Major design projects: Dymaxion house (1928); Aerodynamic Dymaxion car (1933); Prefabricated compact bathroom cell (1937); Dymaxion Deployment Unit (1940); Dymaxion Deployment Unit (1940); Dymaxion Map of the world (1946); Buildings (1943); Tensegrity structures (1949); Geodesic dome for Ford Motor Company (1953) and Montreal Biosphère (1967), United States pavilion at Expo 67.

[11] Fuller coined term "ephemeralization" which means "doing more with less" (Brand, 1999).

In addition, early explorers, such as R.Buckminster Fuller, Victor Papanek, Christopher Alexander and Ivan Illich believed that design has obligation to integrate commercial needs with those of society and the environment (Fuad-Luke, 2007).

Additionally, Packard (1959; 1960; 1962; 1964); and Schumacher (1973) offered socio-economic and political critiques and visions for a more sustainable worldview. Carson (1962) and Lovelock (1979) were highlighting the difficulties being caused by industrialisation and global trade in the natural environment. Many cite the publication of Rachel Carson's "Silent Spring" (1962) as a catalyst for environmental concern and Victor Papanek's "Design for the Real World" (1971) as sparking the emergence of the eco-design movement.

Moreover, the best-known exponent, Victor Papanek, turned on full attention of the ethics of the industrial design profession (Papanek, 1971; Lewis et al., 2001, p. 19; Whiteley, 1993, vii). Papanek, in ecological critique argues for the social and ecological responsibility of the designer: "There are professions more harmful than industrial design, but only a very few of them" (Papanek, 1984, p. ix.). Papanek criticized the design profession for creating products wasteful of environmental resources and submitting to consumerism. From 1970s Papanek, invited designers to consider social and ecological aspects, to abandon "design for profit" and think more about human "real needs" in a sustainable manner. In addition, Papanek believed that it is a great spiritual rebirth or reawakening, a desire to re-establish closer links between nature and humankind "the changing environment of our fragile planet is a result of the things that we do and the tools that we use" (Papanek, 1995, p.8). He challenged designers to produce more ethical products, energy efficient technology for people in developing countries and products, which would not be harmful to the environment. He called for a new design culture based on social responsibility (Knight et al., 2009). Papanek (1971) made a moral, rather than simply ethical, case for the striving for a more environmentally and socially sustainable way of life. Hence, Papanek may be considered to be the pioneer of sustainable and humanitarian design.

Despite the fact that there were also some designers like Papanek, dreaming to change the world, the industrial era, globalization, and hyper consumption were dominating. Designer and educator Papanek probably gave a key lesson at the right moment; however, the rest of the world wasn't ready enough to understand it yet.

The 2nd wave emerged in the late 1980s and early 1990s (see Figure 5) and coincided with the green consumer revolution and environmental crisis (Bhamra & Lofthouse, 2007; Knight et

al., 2009). Environmental crisis[12] helped increase the awareness of society to environmental problems. As a result, in the 1980s, interest in green issues increased, this gave a rise to "green design" (Whiteley, 1993). However, in this era, the green design was only concerned with environmental impacts to a product-based level, such as the elimination of toxic materials or the use of recycled materials. In addition, design educationalist John Wood made the following linking with a meaning of design in the period of 2nd wave: "…style and image provide a more immediate and compelling rhetoric than durability and efficiency" (Wood, 1990, p. 9). The approaches of solving problems were primarily focused on ways to re-design, just trying an environmental improvement for the same product concept and without a life cycle perspective.

Furthermore, in this period, profit and ethical issues were no longer considered mutually exclusive; they altered to be more market-oriented. From being as a tool for the society's problems with time design has changed its foundation to "market- led" or "consumer-led" (Whiteley, 1993). As a consequence, "green consumerism" appears with the publication by John Elkington and Julia Hailes in 1988 "The Green Consumer Guide: From shampoo to champagne, high street shopping for a better environment" (Magde, 1997). Thus, the 2nd wave led to the need of implement environmental labeling systems certified by independent entities.

Moreover, writers such as Manzini (1990); Burall (1991), Mackenzie (1991) and Ryan (1993) began to call for design to make radical changes. However, the authors recognized that improving the environmental performance of manufacturing industry is not enough and that we need an approach cradle to cradle (C2C) in design and manufacturing (Mackenzie, 1997), putting the environment as a concern since the beginning of the process and extending the responsibilities of creators and producers. According to McDonough and Braungart the "green design" of the 1990s is just "less bad", as its focus on reducing waste, improving the efficiency of processes, and selecting less-damaging materials is misguided "eco-efficiency" rather than "eco-effectiveness" (McDonough & Braungart, 2002, p. 62). Instead, authors proposed the C2C model, which theoretically eliminates waste altogether through closed-loop recycling within either technical or biological loops (McDonough & Braungart, 2002).

In the late 1990s Design for X (DfX) strategies was introduced, like a design for disassembly (DfD), design for recycling, design for re-use. DfD refers to a product whose parts

[12] As an illustration, the nuclear reactor explosion in Chernobyl, Ukraine (former USSR), the oil spill from the Exxon Valdez super-tanker on the clear shores of Alaska and others.

can be easily repaired, reused, remanufactured or recycled at the end of its life. The 2nd wave lasted until the design for sustainability became more widespread, towards the end of the 1990s and early 2000s.

The 3rd wave (Figure 5) can be dated from the 1987 UN's Brundtland Report, which introduced SD term. Since then, according to Fuad-Luke (2002) lifecycle assessment programs have been step by step integrated in design processes. According to Ezio Manzini, design is able of giving form to a sustainable society, but it can't modify the world. This means that by giving a form to visibly amplify new types of demand and behavior, together with proposing sustainable criteria for quality. Sustainable consumers need to develop an aesthetic taste for the raw material-waste.

The evolution in terminology of Sustainable design otherwise known as Design for Sustainability (DfS) might be broadly called "environmental design" and is characterized by a progression from green to eco- to sustainable design. In this sense, sustainable design is the "greenest" form of environmental design. Design writer, McDermott (2007, p. 217) points out, that DfS as a design concerned "with the use of resources, including land and energy, with maximum efficiency and at a rate that does not compromise the ability of future generations to meet their own needs". So, the designer figure in DfS, is commonly acknowledged as a crucial, well-placed to plan for the impacts of products across the product life cycle (Vezzoli & Manzini, 2008). Besides that, it is more and more positioned as a "change agent" for more radical societal transformation (Fuad-Luke, 2009; Fry, 2007; Walker, 2006, p. 2011). Describing sustainable design Tischner and Charter wrote: "Part of the process will be to develop a more holistic view and to manage the product development process more effectively to ensure sustainability is embedded at each stage" (Tischner & Charter, 2001, p.137). Put simply "Sustainability is about the well-being of the future" (UNEP 2006, p. 22).

In a summary, research in the field of design for sustainability is now well established, because most of the developed nations now have some form of active research into design for sustainability[13]. Even though, it can still be considered as a new area (Bhamra & Lofthouse, 2007). Moreover, it is an increasingly vital subject for all kinds of designers, whether they work in industrial design, graphic design or architecture (Chick & Micklethwaite, 2011).

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[13] For example: implementation of legislation, eco-innovation, corporate social responsibility, product service systems, eco-redesign, impacts of user behavior, design for disassembly and reverse manufacturing.

Key theme/ approach	Supporting theories from literature
SD approaches	Design for society- John Ruskin (1819-1900),William Morris (1834 - 1896);
	Eco- design - Papanek, 1971; Magde 1997; Fuad-Luke, 2002, 2007, 2009;
	Sustainable Design – Fuller; Bhamra & Lofthouse, 2007; Tischner & Charter, 2001; McDermott, 2007; Chick & Micklethwaite, 2011
Ethics	Socially Sustainable Design - Whitley, 1994; Chick & Micklethwaite, 2011
	Social transformation- Fuad-Luke, 2009; Fry, 2007; Walker, 2006
Lateral thinking	Design Thinking - Papanek, 1971
Materials Flows	Cradle to Cradle - McDonough & Braungart, 2002

Table 1: *Supporting theories from literature (Bitkeviciute, 2013).*

2.2 Upcycling

As Murray points out, that design for upcycling is about "not merely conserving the resources that went into the production of particular materials, but adding to the value embodied in them by the application of knowledge in the course of their recirculation" (Murray, 2002, p. 27). So, reused product, in this research project context- PET plastic bottles, with an add value (economic, intellectual, emotional, material) can be called "upcycled". The jewellery was made into a higher-grade product through a technical process that could be called "material upcycling". The post- consumer PET plastic bottles were turned from packing material into material for jewellery- PET plastic stripes and then to jewellery. This can be called "design-led upcycling".

Over the last decade the term "Upcycling" has been coined and worked into the discourse of sustainability efforts. The term upcycling is most commonly attributed to the 2002 publication of "Cradle to Cradle: Remaking the Way We Make Things" by William McDonough and Michael Braungart. They define "upcycling" as "the practice of taking something that is disposable and transforming it into something of greater use and value" (McDonough & Braungart, 2002). In their book, they explore how this can be done and why, for the good of our planet, we must shift our thinking and designing.

Moreover, Michael Braungart and William McDonough (2002) challenge the idea that humans and human industry must damage the natural world. They have an inspiring idea of a world that has plenty of everything and is at the same time safe, beautiful and effective. New directions in design and architecture don't occur accidentally, but always arise out of real changes in society, cultures and concepts (Papanek, 1995, p. 236).

Thus, reusing materials has been a common practice reusing for centuries, but only now society in general try to understand how to make choices that best serve protect our environment. Since the Dada movement of the early 20th Century, artists and designers have re-appropriated "found objects" as a way of commenting on consumer culture, industrial production and the meaning of art. Also, as Woodham (1997) noticed, well known futurist and designer, Buckminster Fuller and hippie movement tried to make products out of found materials[14]. Upcycling is investigating the different reasons and ways that designers use reclaimed materials in their work and the different cultural implications that these varying strategies invoke. By transforming waste it is clearly is more complex than just a just a desire to tread lightly on the planet.

Additionally, "upcycling" can thoroughly challenge preconceptions about the aesthetics of form. This research project focused on radical reinvention and memory, but today it could also be viewed through the lens of sustainability.

2.3 Metadesign

The context of this research project is the sustainability imperative, and the potentially significant power to provide a positive change that design and designers have. This research project aims to go beyond current notions of "sustainability" by aiming to achieve the more positive idea of a "synergy-of-synergies" (Fuller, 1975). In this section, it will be presented metadesign.

Metadesign (or meta-design) is parallel to what Buckminster Fuller (1969) in his book "Utopia or oblivion: the prospects for humanity" proposed as Prime Design. Therefore, as a concept has been adapted since 1980s into information technologies with reference to art,

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[14] For example: "Drop city" which was constructed from domes and zonohedra geometric panels made from the metal of automobile roofs (Woodham, 1997, p. 234).

cultural theories and design practices focusing more on creating context rather than content (Giccardi, 2005; Fuad-Luke, 2012). As Fischer points out, "Meta-design characterizes objective techniques and processes for creating new media and environments that allows the owners of problems to act as designers and be creative" (Fischer & Scharff, 2000). A simple meta-design example can be Wiki-platform, because it gives a context for users to collaboratively create content. It extends the traditional notion of system design beyond the original development of a system to include a co-adaptive process between users and a system, in which the users become co-developers or co-designers. Besides it is encouraging an "unselfconscious (spontaneous) culture of design" (Alexander, 1964; Giaccardi & Fischer, 2005). It therefore implies transcendence or comprehensiveness. It leads to the invention and design of cultures in which persons can express themselves and draw in personally meaningful activities.

John Wood argues that meta-designers must integrate their best skills of intellectual reasoning and creative judgment to synergize many processes on many levels, simultaneously (Wood, 2008). It creates "beneficial affordances by offering a more holarchic, consensual and transdisciplinary approach – i.e. a superset of design" (Wood cited in Fuad-Luke, 2009, p. 151).

Complex problems can be managed using meta-design by enabling knowledge sharing to encourage "social creativity" (Arias, et al., 2000). Social creativity can be supported by systems that help stakeholders to frame and solve problems. Meta-design, the design of design, provides a comprehensive and dynamic framework for responding to uncertainty.

Fischer (2003) recognizes four main areas where meta-design can be applied; open source development, social creativity, learning communities and interactive arts. It serves as potential sources of new insights, new knowledge, and new understanding.

Moreover, meta-design addresses the following three necessities for socio-technical environments (Fischer & Scharff, 2000). They are as followed:

– They must be flexible and evolve because they cannot be completely designed prior to use.

– They must evolve to some extent in the hands of the users.

– They must be designed for evolution. Developers collaboratively construct systems and help solving problems.

Social creativity is an approach where different points of view are brought together to solve complex problems. Social creativity can be supported by systems that help stakeholders to frame and solve problems.

2.4 Craftivism

In the context of this research project researcher is investigating craftivism as a contemporary environmental or social agenda that provides a strong motivation and framework for professional practice, combining empirical analysis with research project to explore how these motivations play out in makers' work, and how craft knowledge enables them to undertake a range of activism and social innovation roles.

Most of the European countries have a history of domestic thrift craft in which women were braiding rugs from old scraps of fabric, worn coats, and discarded pieces of clothing for reusing them. For instance, underwear into cleaning rags and woollens were unpicked and reknitted. Therefore, the art of craft have frequently been relegated to the field of "women's hobbies" (Turney, 2009).

According to Frayling, the idea of craftsmanship in the twenty-first century "again becoming fashionable in high places" (Frayling, 2011, p. 53).Yet the phenomenon of "craftivism" can be tract back to the William Morris and Arts and Crafts movement of the late 19th-century in the Great Britain. Also, Morris was the first who developed his four founding principles – "unity in design", "joy in labour", "individualism", and "regionalism" which were later on adopted by female-led association based on the promotion of craft art.

The term "craftivism" was coined by artists and collectives in the wake of the September 11, 2001, attack on the World Trade Center. This phenomenon relates to creative, traditional handcraft (often, assisted by a high-tech means of community-building, skill-sharing, and action) directed toward political and social causes (Buszek & Robertson, 2011, p. 197). Thus, it is typically combining elements of "anti-capitalism", "environmentalism" or "third-wave feminism", because their ultimate goal remains the same – to make the world we live in a better place (Craftivism, 2003). Worldwide craftivists believe in transformative power of creativity that enables community development, self-empowerment and anti-consumerist activism.

Moreover, craftivism is centred on use of fibre arts, most especially knitting, often playing upon the juxtaposition of common household materials for the use of political and social causes, "in the hopes of promoting positive social change" (Craftivism, 2003). For the craftivism the product is frequently less important than the process, it is valorisation of quality over quantity.

Further, craftivists have been influenced and driven by Western feminist theory and practice, playing on the irony of familiar stereotypes. For instance, well-known pink tank cover project by Danish artist Marianne Joergensen (see Figure 6). "Tank-Cozy" was not violent protest against the Danish (USA's, UK's) involvement in the war in Iraq (Joergensen, 2007). The tank was covered from the canon to the caterpillar tracks with knitted and crocheted squares made with pink yarn by different people. According the author, the possibility of "knitting your opinions" and the final result as a "visualisation of thoughtfulness" is common element in the project that gives importance beyond words (Joergensen, 2007).

Figure 6: *"Tank-Cozy" by Marianne Joergensen (Joergensen, 2007).*

Movement of contemporary craftivism includes artists, crafters, and designers working in a traditional and nontraditional media. A good example of this is Ivano Vitali, he is an artist who uses paper to knit and crochet with. He creates his yarn by twisting newspaper strips together without using scissors or glue (Figure 7). Ivano Vitali thinks that it is "urgent and indispensable to make a contribution in order to save our ecosystem" and that "people's creativity should be expressed without harming man or environment" (Vitali, 2001)

Figure 7*: Ivano Vitali and paper yarn ball (Vitali, 2011).*

Other makers go even further, developing entirely new and sustainable ways of producing materials. For instance, Laura Marsden, has developed and patented her own unique plastic bag sewing technique, a way of heating waste plastic bags into a new material – "Eternal Lace" (Figure 8). Marsden, draws on techniques learned through sewing and lace making, but as a starting-point for practice-led research into the effects of heat bonding on polyethylene. Marsden research has transformed waste plastic bags into marketable fashion and interiors accessories that aim to challenge consumer perceptions around the undesirability of recycled products.

Thus, artists such as Marianne Joergensen, Ivano Vitali and Laura Marsden are not only adopting new breadth of approaches to environmental activism. Hence, they are also redefining this territory to encompass complex, socio ecological issues.

Betsey Greer (2003), crafter and founder of craftivism.com states on her site: "Craftivism is a way of looking at life where voicing opinions through creativity makes your voice stronger, your compassion deeper and your quest for justice more infinite". She began to consider the intrinsic connection between the words "craft"' – which she thought seemed "like the younger child not taken seriously by "art" and "activism" which she felt "made people feel uncomfortable, conjuring unpleasant images of tear gas and riot gear" Greer, Betsy (2011) (Buszek, 2011, p. 178). She felt that connecting to positive thinks in a new way a positive energy and force for good could bring result.

Craftivism is one way to get involved by using an ancient form of craft integrated with the capabilities of a modern technology (tweeting, blogging, and using Facebook to reach as many

people as possible with our intentions and actions and this can be used to have a far bigger impact as a group. Paradoxically but technology has taken an important part in making craft "cool" Betsy Greer, discuss of an "innate need to create" – this is something that can happen "un-judged" in these on-line networks, don't include with all the ensuing pressures of marketplace and competition (Greer, 2011). Thus, the movement is based on an ethos of sharing and emphasises the importance of not only making but also supporting other makers. This is a reaction against globalisation and the negative impact mass production for the environment. Further, online networks and makers are raising awareness of environmental issues through their work, and challenging the conventions of a consumer society based on over-consumption.

A professor David Gauntlett in his book "Making is Connecting" of 2011 discusses how digital participatory cultures can lead to positive transformations in our society and find a social meaning of making and being creativity. Gauntlett (2011) sugests, that interest lies primarily in social aspects of creativity, such as personal and social empowerment that shared activity of making brings about. In this way, Gauntlett (2011) believes, making and sharing are political acts in themselves and states: "Creativity might be better understood as a process and a feeling". In this way of looking at it, creativity is about breaking new ground, but internally: the sense of going somewhere, doing something that you've not done before. This might lead to fruits which others can appreciate, but those may be secondary to the process of creativity itself, which is best identified from within" (Gauntlett, 2011, p.17). Gauntlett and Greer points out that in the act of making no matter which dimension thing you are making – "the important thing is that people have made a choice – to make something themselves rather than passively consume and this constitutes a political shift in how we deal with the world" (Gauntlett, 2011, p.19; Greer, 2011).

Furthermore, craft connection with activism has an essential role to play in building a more sustainable future because reuse, re-contextualisation and manipulation of existing components and processing them to something new, we can discover through the processes, how to find the quality within any matter.

In addition, reuse and re-contextualisation plays an important part in this research project. It was re-examined, re-evaluated and re-configured material that usually taken for granted and discarded. By combining craftivism with professional practice project seeks to investigate the contemporary role of design to the social agenda.

Figure 8: *"Eternal Lace" by Laura Anne Marsden (Marsden, 2010)*

2.5 Summary

Sustainability primarily arose within the framework of international politics. Sustainability is more a pragmatic approach overcoming social injustice and environmental ills than the idealistic ecological theory like deep ecology and James Lovelock's Gaia movement. Moreover, from the 1960s to the present, it has seen a transition from "green design" through to "eco-design", and culminating in a "sustainable design."

Thus, DfS is one of the key theoretical areas informing this research project. The investigation of the history and theoretical work of both designers and artists working in the field of sustainability is relevant to my research as it allows me a better understanding of the principals and processes behind sustainable methodology and practice and provides a framework and guide, as to how this can be applied to the research project the best.

In reviewing the perspectives of a number of theorists, researcher was able to better understand and identify the steps that need to be taken to incorporate those ideas into the development and practical application of my own work as an artist and designer.

Chapter 3

3 Methodology

This chapter describes the different approaches that have been applied to gather necessary information in order to perform a successful research study. All selected methods and the reasons why all of these methods are used or demonstrated in this part.

In order to provide valuable and reliable research findings, this chapter will present the tools that were used to link the various elements that constitute the project and an attempt will be made at reflecting on the cement that holds those elements together.

3.1 The Research Process

As Herbst and Codwell (2004) points out, that to meet the information requirements in a cost effective and timely manner, the research process necessity carried out in a systematic way. The process can be outlined as follows:

Figure 9: *The research process (Boone & Kurtz, 2010).*

Firstly, a well-defined problem needs to be established to permit the researcher to focus on securing the exact information needed for the solution. The vital step was to define the research question. Further, based on question objectives was identified. When the problem definition has been clarified, was selected how can resolve the research problem by creating a research design. After, the next stage consists of the collection of data. Moreover, in this research project there

are two primary modes of data: primary data and secondary data. The final stage in the process consists of interpreting and presenting the research information (Boone & Kurtz, 2010).

3.2 Research problem

At the basis of the research project stands an empirical problem. The problem formulation section aims at describing the source, nature and purpose of the research question behind this research project. Research problem required a number of theoretical developments and research question drafts in order to find its actual shape.

The research question at the core of this project arose through seeing the sheer number of plastic bottles produced by the industry and subsequently discarded by consumers has caused grievance harm to our environment. Moreover, PET is highly resistant to environmental biodegradation. For instance, causes many and varied environmental concerns associated with its accumulation, including, but not limited to, absorption and concentration of organic pollutants, hazardous effects on marine wildlife and dissemination of potentially invasive species to new environments.

3.3 Introduction into the Research Method

The research study is qualitative, as the selected research method, should to be effective in collecting the data needed to answer the research questions. The differences between qualitative and quantitative research could be observed to form two distinctive clusters of research strategy (Bryman 2008, p. 21). Comparing to quantitative studies, qualitative methods are constructed to gain more concrete and in depth data. Besides, quantitative data are easy to measure and express by the numbers. The quantitative research method is usually associated with the natural sciences, and emphasizes on quantification in the production of empirical data, knowledge, and stressing on measurement, (Bryman 2004, p. 19); it has the possibility to investigate issues by including many informants in the form of filling questionnaires that appears to be inadequate in the context of this research because it would limit the informant freedom of expression and limits the opportunity to comment in detail on complex issues.

What's more, qualitative data are gained from smaller number of individuals or groups (Bryman 2004, p. 275). As Bryman points out, qualitative research is a research approach that usually emphasizes words in data collection and analysis (Bryman, 2008). Just to mention few, it contains the generating of knowledge and empirical framework through interviews, participant observation. It also emphasizes an inductive approach to the relationship between theories and research where it is focused on the generation of theories.

The qualitative method is applied because this would enable the study to come out with a detail examination involving complex issues. This research is qualitative using semi- structured interviews in order to see the research topic from the perspective of the interviewees and to understand how and why they come to this particular understanding. Besides the theoretical part, the practical case deals with a case study approach in examining the perspectives of different points of views of various professionals concerning the questions of research. Also small scale focus group approach has been used as a follow-up to a quantitative study, to explain, in order to gain some understanding about the reasons for certain findings.

3.4 Secondary Data Collection

The beginning of this research can be seen secondary data collection. Firstly, it was necessary to study and review many relevant data to know and understand the area of the research. According to Bryman secondary data collection requires the investigator to depend on materials and research that has been compiled previously by other researchers (Bryman, 2012, p. 311). Secondary data - in-depth study of written material like academic books, journals, newspapers, magazines, internet articles and sources and provisions provides the facility "far higher quality then students could collect themselves" (Bryman, 2012, p. 316). The advantage is that it virtually reduces the time and money needed to obtain the desired information.

Secondly, it was used secondary data as an indicator to do further research. According to Bryman and Bell (2007), secondary analysis is the scrutiny of available data by previous studies or other researchers who probably have not been involved in the collection of those data. This data is concerned as an important tool for gathering all relevant data according to the purposes of this research. The secondary research used in the study is in combination of data from variety of sources from official documentations obtained from official artist's webpages and also literatures

and other sources from internet. However, there are some limitations when obtaining secondary research (see Table 2). Thus to make-up this weakness, the study also rely on primary data that provide first-hand information got from interviewees.Those are the reasons to support why secondary data was applied in this research.

Benefits	Limitations
Cost effective	The data was made for another purpose and therefore do not match
Time saving	Presentation properly effected by the purpose
Efficiency	Evaluation quality
Can provide comparative data	Can be expensive to obtain info
Long time studies	Aggregation and definitions might not be suitable
New findings	Validity

Table 2: *Benefits and Limitations of Secondary Data (Boone & Kurtz, 2010).*

3.5 Primary Data

Primary data are collected to address the information needs of a specific research inquiry and do not exist prior to data collection (McGivern, 2006, p. 60-61). Primary data is data that is original and has never been published before. It could be collected through different forms such as observation, questionnaires, discussion, in-depth interviews, or through tests.

Furthermore, researcher has observed the methods of primary research in order to decide which could best be related to the data collected. The selected methods are as follows:

– **Interviews:** Interviews will provide information from a three interviewees and provide an expert or knowledgeable opinion on a subject (see 3.8). Researcher is using semi-structures email interviews.

– **Observation:** Diary as a self-reflective mode of record-keeping (see 3.9).

– **Focus group:** involves organized discussion with a selected group of individuals to gain information about their views of a topic. Focus group was used to interview particularly for obtaining several perspectives about the same topic (see 3.10).

– **Case studies:** tries to find underlying principles (see 3.11).

3.6 Interview

Interview is a form of primary research for collecting qualitative data (McGivern, 2006, p. 63). The goal of qualitative research is to see the research topic on the interviewee's perspective and there is much greater interest in the interviewee's point of view (Bryman, 2012, p. 470). As Kvale points out, that an interview is regarded as a situation of knowledge creation between the views of the two parties in a conversation (Kvale, 1997, p. 296).

However, qualitative interviews have been criticized as information that there are the difference between what people say and what they actually do (Deutscher, 1973). This is a positivist view and it has been taken into considerations of the researchers of this study. That is why in this research are actually very concerned with what is really happening, rather than what the chosen expert interviewees had to say about what is happening. To minimise bias, it would be ideal to collect others' points of views and wording of what is happening (Yin 2003).

Furthermore, there are a number of ways to conduct interviews generally as a semi-structured process aimed at revealing subjective viewpoints accessible to interpretation. They include semi standardised, problem-centred and expert-oriented interviews (Flick, 2002).

The interviewer and respondents engage in a formal interview and are partially structured through the use of opened questions checklists. As described by Bryman, semi-structured interviews have a less meticulous structured, which mean that it have a freedom to decide how to replay a direct question and answer sequence but develops in the course of the interview (Bryman, 2012). As Kvale states, the inexistence of a standard set of rules create an open-ended field of opportunity for an interviewer`s skill, knowledge and intuition (Kvale, 1997, p. 84). This semi-structured interviewing method embodies open questions that subsequently become easier to have an in-depth knowledge about the issue under investigation, it allows conversation to flow more naturally, making room for the conversation to go in unexpected directions, obtain information and knowledge's that have not been thought in advance.

For the interviews was taken into consideration of the problem formulation. According to Kvale, "individual interview vary according to the content of the interview such as seeking

factual information, or opinion and attitudes or narratives and life history" (Kvale, 1997, p. 101). Thus the interview guide was designed in order to seek opinion a from Aurora Robson, Fabiana Gadano, Sonya Sanchez Arias and better understanding about artist working with waste materials. Interview had 14 questions (see Appendix B).

Since Aurora Robson lives in New York, Fabiana Gadano in Buenos Aires, Sonya Sanchez Arias in Florida and researcher in Porto interviews were conducted via email. Researchers have chosen email interviewing because it offers unprecedented opportunities for qualitative research, providing access big amount of potential research participants who are otherwise inaccessible. In addition, the method can be employed quickly, conveniently, and inexpensively and can generate high-quality data when handled carefully. Besides, semi-structured email interviewing can be a viable alternative to the face-to-face and telephone interviews, especially when time, financial constraints or geographical boundaries are barriers to an investigation (Bryman, 2012). This is reasons why was chosen to use qualitative email interviews for this research project.

3.7 Interview setting

At the beginning of each interview, the problem field was explained to the interviewees, as well as the purpose for which the study was conducted. The purpose of the explanation was first to seek the awareness of the interviewees and also give them a broad knowledge of what the study was about. The research used the semi-structured interview technique to elicit the participant's views concerning research areas. However, due to the nature of semi-structured interviews it should be noted that the progress of the interview is usually altered depending on the responses of the interviewees.

3.8 The Interview Respondents

The below table comprises of a visual representation of the three respondents involve in the interviews.

Respondent	**Place**	**Position**	**"Message"**
Sonya Sanchez Arias	Florida, USA.	Professional photographer, photo stylist, photo art director and Recycle artist.	"To see the beauty and potential of all things, and the possibilities that a different point of view can create. It may be an empty water bottle, plastic utensils, rubber tubing, electrical wires or plastic bags. Whatever the material or the original purpose, it can be transformed into something new and unexpected with a new reason for existing" (personal communication, June 17, 2013).
Aurora Robson	New York, USA.	Multi-media artist, environmental activist, lecturer, founding artist of "Project Vortex".[15]	"People need art and culture in their lives and this place gives that to them. My hope is that people see my art and think more about how a small act like wasting can have huge ramifications." (personal communication, July 24, 2013).
Fabiana Gadano	Buenos Aires, Argentina.	Jeweler designer and a teacher in her own workshop.	"We need to take actions on our environment and reduce waste. It is not that reusing a couple of bottles will solve the problem of waste in our world. It is that we, as community should think on less consumerism, or at least in the way articles are commercialized and packed" (personal communication, June 19, 2013).

Table 3: *A visual representation of the various respondents (Bitkeviciute, 2013).*

[15] "Project Vortex" is a growing international collective of creatives dedicated to working with plastic debris. Their goal is to help protect our most valuable shared resource [water] for generations to come. They are focused on supporting relevant clean up projects and creative endeavors as well as the many organizations dedicated to raising awareness about plastic pollution.

As seen above three participants were involved- Sonya Sanchez Arias, Aurora Robson and Fabiana Gadano.

It was clear from the interviews that were conducted that artists identify strongly with a particular environmental or social position. For all three artists, indeed, had become a way of making a living whilst remaining true to – and developing – particular values.

3.8.1 Interview with Aurora Robson

Aurora Robson is an environmental activist. The Canadian-born artist's elaborate sculptures and installations (Figure 10, 11) are made from cut-up plastic bottles and other bits of discarded plastic, which are sold to support further environmental reclamation and awareness.

Robson uses everyday waste such as discarded plastic bottles and junk mail to create intricate sculptures, installations, and collages. Over the years, Robson has intercepted tens of thousands of bottles, saving them from their ultimate destination at the landfill or costly recycling plants. "Deeply concerned about the natural environment, Robson sees herself as an eco-activist who uses her art to address urgent issues poetically, not polemically. She is best known for assembling cast-off plastic bottles, which she colorfully paints, into wildly inventive hanging sculptures the smaller ones sometimes containing LED lights and large works that fill entire rooms" (Art in America, 2009).

In addition to her work as an artist, Robson is the founding Director of "Project Vortex", an international organization of artists, architects and designers working with plastic debris – working with Project to reduce the amount of plastic debris littering our oceans and shorelines.

Robson's work has been exhibited in numerous solo and group shows across the United States, and has been featured in magazines such as Art in America, Juxtapoz, Artworld Digest, and the cover of Arts Houston to name a few. Most recently, she was awarded the 2010. The Arthur Levine Foundation Grant.

Figure 10: *"Trichotomy" by Aurora Robson (Robson, 2010).*

Figure 11: *Installation by Aurora Robson (Robson, 2010).*

3.8.2 Interview with Fabiana Gadano

Fabiana Gadano is a jewellery designer who also works as a teacher in her own workshop in Buenos Aires, Argentina. She has a degree in Industrial Design at La Plata National University. Further, Gadano is taking concern about environmental protection and a careful use of natural resource, water "careless use of plastics is threatening and destroying our environment" (personal communication, June 19, 2013) (Appendix C, 2). According to her "it is high time we, artist, put an accent on this theme focusing our thoughts and actions in a proactive cause" (personal communication, June 19, 2013). For her collections she has been using mostly PET recycled from plastic bottles (Figure 12). Gadano thinks that the aim at revaluing waste plastic by reassigning it as protagonist material in contemporary jewellery.

Furthermore, in her workshop she is conducting an exercise with her student where each of them is developing jewellery pieces out from computers, CD, plastic shopping bags, shampoo flasks, dairy containers, etc. She says "It is unbelievable the quality and novelty in jewellery we are managing!", besides that, "It is a great challenge to make a jewel out of waste, also experimentation is cheap as there is so much material available and the results can be highly rewarding" (personal communication, June 19, 2013).

Adding, Gadano states that artists "need to take actions on our environment and reduce waste. It is not that reusing a couple of bottles will solve the problem of waste in our world. It is that we, as community should think on less consumerism, or at least in the way articles are commercialized and packed. Creativity and unexpected use of waste materials can help people to focus on the existence of them, otherwise thinking where are they going when not applied in art pieces" (personal communication, June 19, 2013). According to her consciousness on this issue is growing steadily and in the future it will be a regular practice, not something out of common.

Figure 12: *Fabiana Gadano jewellery (Gadano, 2012).*

3.8.3 Expert interviewee

The method is similar to the individual in-depth interview, however, moderating is much more targeted as the expert has a high degree of skill and knowledge in a certain domain, field or industry due to long time experience and has status, power to act and decision making opportunities based on these skills and knowledge. Moreover, in the interview in the expert might bring ideas and give information about which interviewer had not thought before. Therefor expert interviews are very valuable. However as there is a higher dependence on experts provided information, the risk of bias due to contaminated answers is higher (Bryman, 2012). Thus in this research was tried to be even more critical about provided answers from experts which have interviewed.

Figure 13: *Sonya Sanchez Arias jewellery (Arias, 2012).*

With the purpose of gaining knowledge about waste reclaiming and reinterpreting was interviewed Sonya Sanchez Arias (Appendix C, 3). She is a successful photographic stylist, commercial photographer, and photographic art director for more than 20 years, "transforming that which others see as commonplace into the extraordinary" (personal communication, June 17, 2013). Moreover, Sonya Sanchez Arias creates one kind limited edition "Eco-Friendly" jewellery (Figure 13). The artist has gained recognition for her Recycled Art both nationally and in the Caribbean. Her jewellery art follows the "up-cycling" movement, because of that I choose her as an expert interviewee.

3.9 Diary writing

Diary (Figure 14), as a self-reflective mode of record-keeping, is a fundamental requirement of all qualitative research. It is critical to anthropology and case studies where longitudinal research[16] is conducted. It also provides an important method for satisfying the onus on researchers to be transparent and self-critical within a qualitative research approach. Diary writing is an extensive form of note taking in which detailed, systematic observations of the research field, including self-observation, are made. The researcher builds knowledge incrementally through self-reflective dialogue to capture a range of subjective and objective phenomena contributing to the 'life-world' under study. This option has real merit for this research as it allows the researcher close observation and reflection upon the conduct of the research within its everyday context.

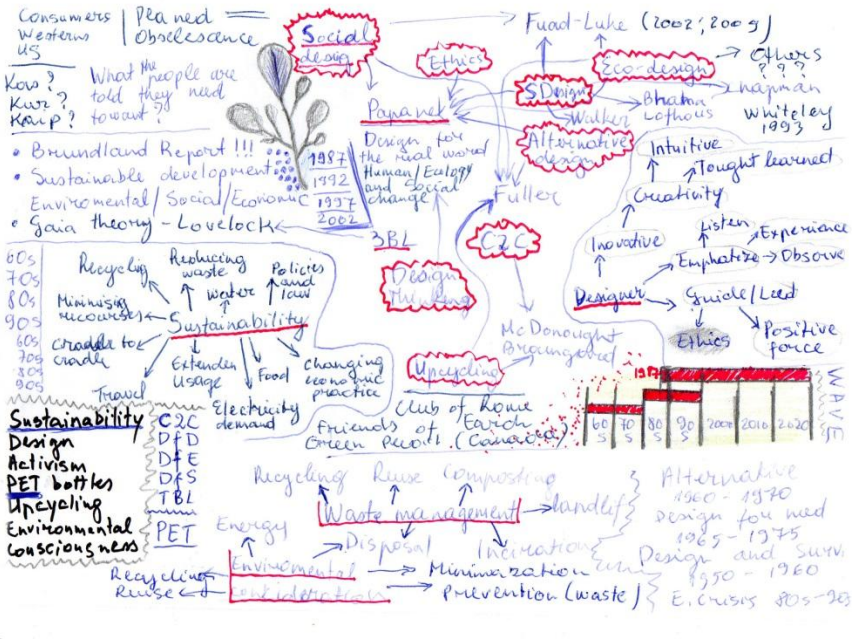

Figure 14: *One page of the diary (Bitkeviciute, 2013).*

[16] Longitudinal research is carried out over an extended period of time to enable in-depth exploration and analysis of social phenomena, in particular as these develop or change (Mills et. al, 2010).

3.10 Focus group

Focus groups share many common features with less structured interviews, but there is more to them than merely collecting similar data from many participants at once. A focus group is a group discussion on a particular topic organized for research purposes. This discussion is guided, monitored and recorded by a researcher. Hence, smaller but focused samples are more often used than large samples (Bryman, 2012). Also, focus group creates an accepting environment that puts participants at ease allowing then to thoughtfully answer questions in their own words and add meaning to their answers. Focus groups can reveal a wealth of detailed information and deep insight.

Further, a negative aspect of group discussion must be acknowledged: the concerns of a single individual can influence the opinions of a whole group. This problem can be countered by the interviewer's precise structuring of questions to allow little room for participants to argue or exert influence.

Following the general introduction (Appendix D) and signing of the consent form, the researcher started the focus group discussion, with a timeframe of 1.5–2 hours. The interviews were audio taped. The sessions were conducted in the FBAUP south pavilion.

Moreover, it is usually recommended to include between 7 to 10 participants per focus group, this number ensuring the presence of a range of opinions, while offering a fair chance to interviewees to participate in the discussion. From expected 10 participants showed up only 6. Researcher had initially planned to recruit equal number of women and man aged between 18 and 25, along criteria related to their screening status and their social characteristics:

- Social position: low, middle and high;
- Age : women and man aged between 18 and 25 years;
- Students in Porto.

Thus, participants in a focus group discussed a specific theme that had been decided in advance; in this case, "Eco-conscious message in a bottle". The interview guide was elaborated around main topics: recycling, reuse, upcycling; environmental awareness and plastic pollution in Porto context.

According to the participants, communities are increasingly recognizing the importance for people to recycle plastic bottles and minimize the impact of their waste. Also, plastic waste is an

important topic in environmental policy. When participants were asked about “what is plastics recycling rate in Portugal?” participants indicated as the “highest recycling rates 30% and the lowest 10 %”.

Other question was about the importance of recycling, reuse, upcycling, discussion showed that participants think it is important to recycle, but levels are still not, what they should be.

3.11 Case Study

A case study is an in-depth, empirical description of specific instance of phenomenon within a real-life context that is based on multiple source data (Merriam, 1998; Yin, 1994). Besides the theoretical part of the paper, the practical case deals with a case study approach in examining the perspectives of different points of views of various professionals concerning the questions to be researched.

According to (Yin 2003), the five different kinds of research strategies entail experiment, survey, archival analysis, history and case study. This study would make use of the case study research strategy.

According to Bryman, a basic case study is drawn of the detail and intensive analysis of a single case (Bryman 2008, p. 52). And Yin added that a case study is an empirical enquiry when investigating a contemporary phenomenon within its real-life context, especially when the boundaries between phenomena and context, are not clearly evident (Yin 2003, p. 13). The case study is especially advantageous when “how” and “why” questions are asked about events over which the researcher has a limited control. The question for this study is about the “how” related research question.

A case study may adopt single case or multiple case designs. Yin argues that a single case study is appropriate where the case meets all the required conditions for testing theories, where it is a unique case or a revolutionary case (Yin as quoted Darke et al 1998, p. 277). And this allows researchers to investigate phenomenon in-depth to have rich description and understanding. Whereas, multiple-cases design provides cross-case analysis and comparison, couple with the investigation of a particular phenomenon in a diverse setting (Yin as quoted Darke et al, 1998, p.

277). In this wise the study has adopted the multiple-case study, where Gülnur Özdağlar and Tatiana Pagés is used to compare.

3.11.1 Gülnur Özdağlar from Turkey

Figure 15: *Gülnur Özdağlar and her jewellery (Özdaglar, 2012).*

Gülnur Özdaglar has been producing works of art in the fields of architecture, graphic design, and photography since 1986. She began re-designing discarded PET bottles into usable art and jewelry (see Figure 11) in 2008 (Özdaglar, 2012).

Artist, Gülnur Özdağlar, in her site states that "Plastic bottles - that environmental bane of a disposable, modern society - can be both an abundant form of pollution in waterways and oceans, as well as a materials source for mind-boggling art" (Özdaglar, 2012).

By recreating the form that simple PET takes she changes the intrinsic value of the PET bottles and gives a new life. She aims to create new objects from discarded things so that we would want to exhibit or wear them, highlighting the importance of recycling and thus encouraging it (Özdaglar, 2012).

Her blog and Etsy store are named “Tertium Non Data”, which is Latin for “the third is not given” - a reference to an alchemic term relating to the process of combining two disparate elements to create a new, third element. Gülnur’s work shows how everyday object like PET bottles, the worst environmental scourges of our time became astatically acceptable.

3.11.2 Tatiana Pagés from United States

Tatiana Pagés with more than 25 years’ experience in marketing/fashion and for the past 10 years Tatiana has been exploring the relationship between the environment and our identity and how accessories are rituals for cultural expressions. In 2010 Pagés created “Origomu”, a movement that inspires environmental action through design and involves turning recycled plastic waste into art-wear. Pagés with her moment inspire environmental action through design and involves the practice of using recycled plastic waste and turning it into art-wear. Using the design community as a launching pad, “Origomu” has become a global movement. “Origomu”, in New York City became part of the Department of Education's Visual Arts Program as well as the Eco-Fashion Going Green Exhibit at the museum at FIT.

There are about 500 “Origomu” designs from over 25 countries and more than 700,000 six-pack rings have been reused (“Origomu”, 2010). After more than 20 million media impressions, “Origomu” is continuing to involve people, showcasing inspiring forms that encourage both creative thought and a creative sense of stewardship towards the world. “Origomu” believes that education and inspiration is a key to motivate people to act and to embrace a greater sense of responsibility towards our planet and because of that “Origomu” offer free workshops to share the technique in an ongoing basis.

Figure 16: *Tatiana Pagés in Pratt Institute Workshop, New York (Origamu, 2010).*

3.12 Triangulation

The triangulation approach has also been adopted. Triangulation entails "using more than one method or source of data in the study of social phenomena" (Bryman 2008, p. 379). According to Denzin (1978 cited in Patton, 2002) there are four types of triangulation techniques: "data triangulation" which is the use of a variety of data sources in a study, "investigator triangulation" which is the use of more than one researcher or evaluator, "theory triangulation" this is the use of multiple perspectives to interpret a single set of data, and "methodological triangulation" which is the use of multiple methods to study a single problem or phenomena. Other types of triangulation techniques are analyst triangulation, which is using more than one analyst to review findings, and theory/ perspective triangulation whereby multiple perspectives or theories are used to interpret the data (Patton, 2002, p. 556). In general triangulation is the consistency of findings across methods and data sources.

For methodological triangulation, the study combined different methods of data collection such as primary interviews. Therefore, sources of information used for the study is collected from several sources such as interviews with the Aurora Robson lives, Fabiana Gadano and Sonya Sanchez Arias, case studies of Gülnur Özdaglar and Tatiana Pagés and focus group discussion. The significant of this approach is to have an insight on their different point of view, to check whether they agree on their different perspectives concerning design-led upcycling,

3.13 Validity

The concepts of validity vary according to different researchers in qualitative studies. According to Joppe, validity determines whether the research truly measure what it is intended to measure or show how truthful the research result should be, (Joppe as cited in Golafshani, 2003).

Furthermore, qualitative researchers should reclaim responsibility for reliability and validity by implementing verification strategies integral and self-correcting during the conduct of inquiry itself. Two types of validity are observed in qualitative research: the internal validity and external validity. As citing Bryman "internal validity is a method where there is a good match between researchers" observation and the theoretical ideas they developed" (Bryman 2008, p.32). Therefore the study estimated the validity of the research to see whether the theories and

concepts used can adequately explain the phenomenon the study set out to investigate. With external validity, (Bryman, 2008, p. 33) argued that the issue is concerned with the question of whether the results that is got from the study can be generalized beyond the specific research context.

3.14 Limitations

This study includes the following limitations resulting from the design and setting of research. First of all, as with all forms of investigation, the researcher's background, the time in which she was writing and her selection criteria, will all impact on the research project.

Further, it must be noted that researcher live in Porto. So, the interviews were carried out not face-to-face, but only via internet, because Aurora Robson lives and works in New York, USA, Sonya Sanchez Arias in Florida and Fabiana Gadano in Buenos Aires, Argentina.

Chapter 4

4 Project

This research project explores the potential of post-consumer PET plastic bottles. It aims to question the relationship between design and user, subject and observer, material and sensory receiver. The project is based on a study of the process where post consumer PET plastic bottle's plastic can be turned back from waste to a useful, desirable and pleasing object and try to challenge people's expectations. What makes an object valuable? I take a material not seen as precious and give it a new value to show that it can be beautiful and challenge receiver's expectations.

In the context for this project sustainability is starting point. In combination with lifestyles and increasing consumption level, and consequently increasing impacts to environment, it is increasingly pertinent to consider the impact of design on our everyday life. Design has potentials that leads to innovation in this area.

Abandoned materials are the starting point for a whole new practical creative expression and plastic as the main working material because it is the most common material used by people and it is winning an integral part of our existence. From all types of plastic it was selected a PET plastic of consumed bottles of drinks. PET plastic bottles are ready-made object that is overlooked its high potential properties after its consumed ones. As well, PET post- consumer plastic bottles, because a number of benefits come from the use of PET plastics. Also, PET plastics are translucent, durable and strong. Moreover, perhaps most importantly in many applications, it can be used repeatedly and can be recycled.

Researcher used waste- PET plastics by making the jewellery in particular- necklaces, because it challenge- in jewellery making is dominated by precious materials. It was intended to show plastic awareness in an artistic expression.

In researchers view, the need to create environmentally and economically sustainable societies is interlinked with the need to attend to human sustainability. Further, vision of post-consumer PET plastic bottle futures is linked to the promotion of human sustainability through design, in particular with relation to our consciousness.

The project has also made a significant conceptual contribution to the development of the design theory for upcycling PET bottles. The guiding principles that can be derived from the outcomes of the project include:

– The consideration for the hierarchy of recycling;

– The generation of alternative and supporting actions;

– The design for future recyclability, and if possible, future upcycling;

– The design of jewellery with zero waste;

– The design of post- consumer PET plastic bottle that could maximise the benefits of the product;

– The considerations for scale - small is beautiful, and start local - but think global.

4.1 Inspiration

This research project was inspired from a somatic point of view, lines in the nature, honey bee combs, geometry and fiction imagery. Also, from a design perspective researcher gets inspired by the projects such as "Origomu" by Tatiana Pagés and "Recycle Runway" by Nancy Judd. Besides, it was hugely influenced by concepts such as socially and ecologically responsible design with design writers such as Victor Papanek and William McDonough with Michael Braungart concept that "waste need not exist at all" and "that we need to change the whole design processes" (McDonough & Braungart 2002). Finally, fashion designers work of Alexander McQueen and Iris van Herpen.

In the beginning of the research project researcher started to mess around with plastic bottles and it ended in a small collection of handmade jewellery all produced out of post-consumer PET plastic bottles materials. Inspiration for necklace forms came from experimentation with material. Through the research and experiment, PET plastic bottles was transformed into material (see Figure 11) for jewellery and later on formed into the necklaces.

In this project, researcher tried to use outstanding characteristics of bottles in this project, mostly translucency and the biomorphic feature of PET plastic. I was inspired to make this specific work forms mostly, because of feature of PET plastic bottles.

Furthermore, project explores the beauty of translucency through the PET plastic bottles, and challenges perception of material value in everyday life, because after bottle has been used

once it lost his value dramatically. I aim to bring out its aesthetic value by experimental processes transformation of material that was chosen.

Figure 17: *PET plastic bottles material for jewellery (Bitkeviciute, 2013).*

4.2 Technique

True the experimentation researcher had developed a device prototype (see Figure 13) which can be used to rapidly shred PET bottles into ribbons. The technique makes use of natural resources and waste material to generate a desirable end-product. The technique to transform stripes into jewellery uses only hot water or hair dryer and simple hand tools. The example (Figure X) shows how this could be done.

Figure 18: *PET shredder prototype (Bitkeviciute, 2013)*

Process consists of two stages:

1. Preparation

Bottles are washed out with hot soapy water. Removed any labels and then for ample drying time before constructing.

2. Formation

The plastic bottle is shaved into thin strips using a handheld cutting device. The width of the strip of necklaces is about 2 and 3 mm;

Then the plastic strips are wounded around on the form into the desired worm;

Form with stripes around is immersed in hot water which causes the plastic to shrink and harden around the pins. Note, PET plastic becomes soft by 70ºC.

Figure 19: *Material experimentation (Bitkeviciute, 2013).*

Experimentation

The upcycled jewellery is produced in the medium of PET (plastic bottles)

1. Experiment with twisting the stripe. A tight twist looks completely different than a loose twist.
2. For added strength, twisted or braid multiple wires together.
3. With heat gun: The temperature of the hot wind: (From vent) For 15cm > 100℃ and for 20cm > 80℃.
4. Hair dryer: The suitable temperature is in the vent very close position.

4.3 Images

In this project photography is more than just a simple presentation of objects. It is based on only one material – plastic. It approaches photography in an artistic and imaginative kind of way. The images are about taking aspects of life out of context and dramatizing them to create something new. It tries to capture a specific emotion and mood that associates with the fashion

that is shown. Also, it tries to amplify the gap between the materials and their couture in a provocative and ironic kind of way. It creates the setting which transforms the original plastic look in to something valuable. Moreover, it tries to create science fiction imagery, cyborg inspired style modern minimalism look to the future of fashion- Retro Futuristically Feminine. Intention was to reinterpret costume design seen in the popular Sci-fi film genre.

The photo session was made in the Faculty of Fine Arts of Porto University photography studio. Ladies in photos are not professional models. I did all hair, make-up, costume designs, styling, productions and photographs by herself. All aftermath of all her photo session was a playful, instinctive yet thought-through process.

Pictures (Figure X-X) that were taken in a studio and later on processed and combined with 3D images which researcher made in 3D software. I used software Autodesk 3ds Max Design 2012 (rendered in mental ray) and Adobe Photoshop CS6.

Figure 20: *Test shoot with Bruna Amaral (Bitkeviciute, 2013)*

Figure 21, 22, 23: *Test shoot with Bruna Amaral (Bitkeviciute, 2013)*

Figure 24, 25: *Test shoot with Bruna Amaral (Bitkeviciute, 2013)*

Figure 26, 27: *Test shoots with Bruna Amaral (Bitkeviciute, 2013)*

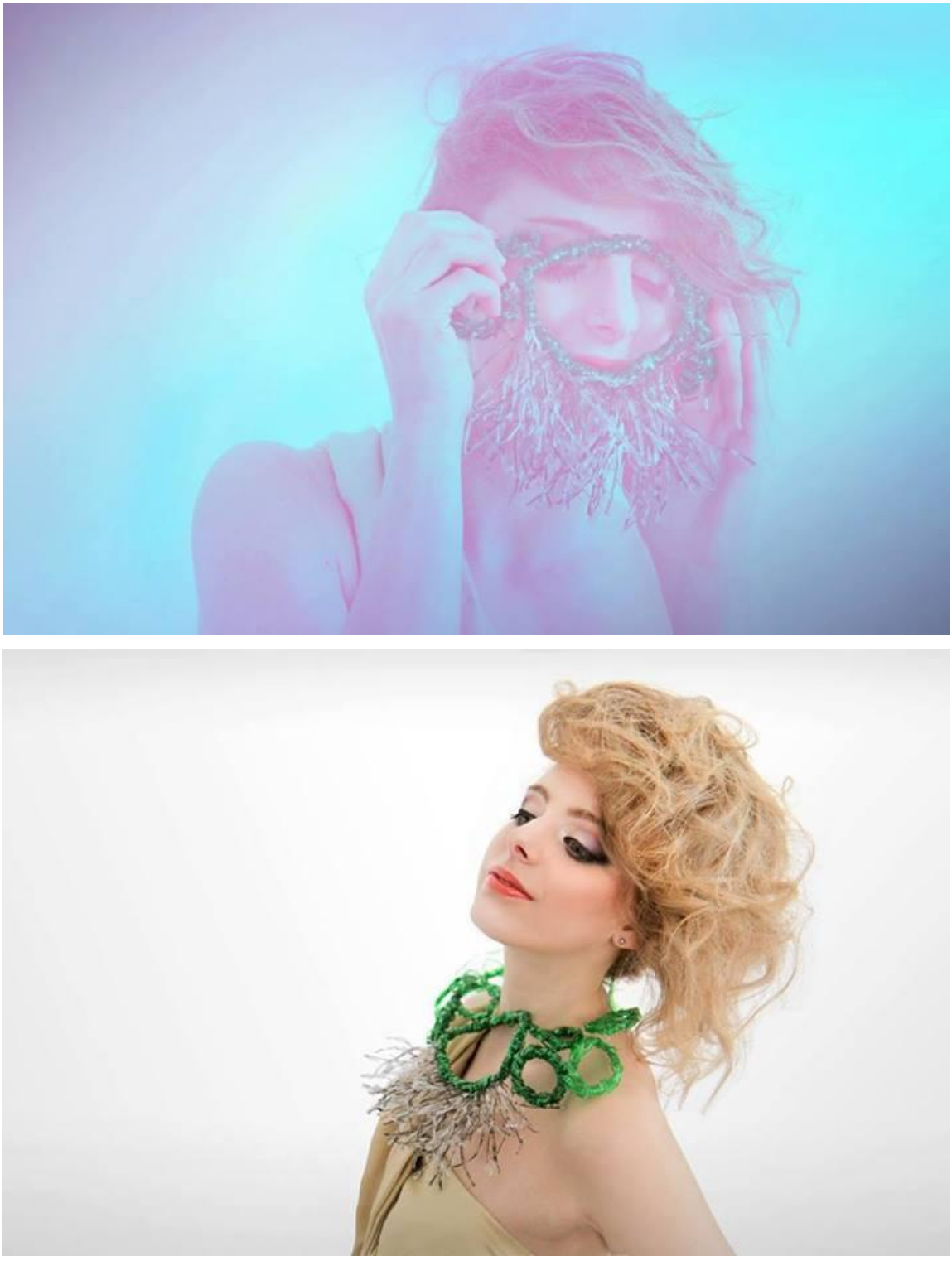

Figure 28, 29: *Test shoot with Tania Gomes (Bitkeviciute, 2013)*

Figure 30, 31: *Test shoot with Bruna Amaral (Bitkeviciute, 2013) Test shoot with Tania Gomes (Bitkeviciute, 2013)*

4.4 Artist’s book

The book is named "Eco-conscious message in a bottle ". Book was published in a small edition. It is an artist's book, which consist if a mixture of text and image. It doesn’t have the conventional reading sequence like the European book, from front to back (left to right). It was intended to make a narrative development that would rely on this sequence. It aims in this research project, the "reader" to create his or her own sequence by entering the book at any point, viewing the pages in any order. Also it wasn’t intended this book to look like other works, so it was constructed as to completely frustrate the desire to read in a "normal" sequence. This book call into question the very physical structure, forcing us to wonder whether this work can even been called a "book".

Furthermore, all textual as well as the visual content tries to reflect the research. Moreover, this book consists of original images created by the researcher and texts and some quoted texts of authors like Victor Papanek, John Wood and Michael Johansson. Book is a conceptual piece; only permanent traces of an ephemeral art work.

Quiets from "Book as Image":

- “Design is the conscious effort to impose meaningful order” Victor Papanek
- “Objects gain their value through the situations in which they are placed” Michael Johansson.

4.5 Site (blog)

Blog is interactive, allowing visitors to leave comments on the blogs. It provides commentary on a particular subject in this case recycling and reclamation from artistic point of view. Although, this “Ecoconsciousproject.blogspot.com” combines text, images, Web pages, and other media related to the topic. The ability of readers to leave comments in an interactive format is an important contribution to the popularity of this blog. Research project blog is primarily textual, although some focus on art, photographs, and videos related to reusing and recycling in an artistic expression.

Chapter 5

5 Conclusions

The final chapter of this dissertation looks critically at the research questions, summarizes the results, and evaluates the methods used in the study. A discussion of the findings within the scope of the research questions, and the variables, both dependent and independent, are presented. Implications for theory and practice are outlined. The chapter concludes with the study in several areas and a recommendation for further research.

5.1 Summary of the Study

The particular knowledge that only a design researcher can bring to the process of design-led upcycling can be seen as instrumental in this practice, and was demonstrated throughout the project.

5.2 Conclusion

The purpose of this study is to examine how can jewellery made from post-consumer PET plastic bottles reinforce awareness of sustainability in a Porto context? In this connection, researcher interviewed three artists who have been involved in the socio environmental concerns. The interviews with Fabiana Gadano, Sonya Sanchez Arias and Aurora Robson provide better understanding about artist working with waste and an expert or knowledgeable opinion on a subject.

Assuming the motivation and expectations are the basis of the relationship between the artistic expression and environmental message was found from the interviews that the Fabiana Gadano, Sonya Sanchez Arias and Aurora Robson are motivated mostly by their personal achievement and the holistic motives. Also, to bridge the gap between professional and personal value systems, for a more holistic and embodied engagement with the sustainability imperative.

Meanwhile the case study approach are found that are motivated by the craftivism connection has an essential role to play in building a more sustainable future because reuse, re-

contextualisation and manipulation of existing components and processing them to something, we can discover through the processes, how to find the quality within any matter.

Thus conclude from the observations in chapter 4 and 5 that the relationship between the sustainability and the socio environmental concerns is highly contested by their motivations, by creating an understanding within and in between, commitment towards each other and creating meaning.

5.3 Recommendation for further research

As this research has been carried out only within a small group of volunteers and artist interviewees who were involved in different activities but not together, it is certain the findings of this research cannot be generalized or assumed valid in terms.

However this study provides a scenario, how despite of clear task and objective the artist working in the field and focus group find their way to support each other and take part in environmental activism. Similar issues and even intensive study in the future would assist the interested and concerned to understand phenomenon from various perspective.

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Appendixes

Appendix A: Interviewees

Appendix B: Interview Questions

Appendix C: The interview answers

Appendix D: Focus Group Schedule

Appendix E Questions for a Focus Group

Appendix F: Selected emails

Appendix A:

Interviews:

1. Interview (2013-07-24), with the **Aurora Robson** from Canada, via email

Email: info@aurorarobson.com

www.aurorarobson.com

2. Interview (2013-06-19), with the **Fabiana Gadano** from Argentina, via email

Email: info@fabianagadano.com.ar

http://www.fabianagadano.com.ar/

3. Interview (2013-06-17), with the **Sonya Sanchez Arias** from USA, via email

Email: Sonya@SanchezArias.com

www.sonyasanchezarias.com

5.4

Appendix B:

Questions:

1. Please tell me your name and what do you do for a living.
2. Tell me a little about yourself (background, hometown, major, artists who inspire you, art that you like to do).
3. How and why did you decide to use materials that would've otherwise gone to waste to create your pieces?
4. Do you work from life, or from photographs or from imagination?
5. What materials do you use and what techniques do you employ to turn the materials into your pieces?
6. Which material do you work with most?
7. Why did you decide to work with waste materials?
8. Do you think working with waste by reclaiming and reinterpreting can be inspiring example to others?
9. Do you have a specific message in mind? If so, what was your message?
10. What part do you think artists play/ can play/ should play in creating awareness about social and environmental issues?
11. In which ways do you feel could your work change people's relationship to waste?
12. What are your thoughts about future of recycled and reclaimed design in general?
13. Are you planning to continue working with "unusual" materials on future projects?
14. Is there anything else you'd like to mention that I didn't ask? Do you have any final comments or statements you would like to add?

Appendix C:

The interview answers:

Interview with the **Aurora Robson** from Canada, via email

Interview with the **Fabiana Gadano** from Argentina, via email

1. My name is Fabiana Gadano. I am a jeweler designer and work as a teacher in my own workshop in Buenos Aires, Argentina.
2. I've got a degree in Industrial Design at La Plata National University. La Plata city is located 50 km away from Buenos Aires. Now I live and work in downtown Buenos Aires, the capital city of Argentina. I specialized in Jewelry, attending different workshops for many years. For long time Italian jewelers as Escola di Padova with Babetto, Zanella and Marchetti were among my favorites. I enjoy all sort of contemporary art, having studied for many years classic art, as well, at school of Fine Arts, though.
3. Careless use of plastics is threatening and destroying our environment. It is high time we, artist, put an accent on this theme focusing our thoughts and actions in a proactive cause.
4. I work from life and imagination. Photographs are a good background to feed my investigations.
5. In my own collections I've been using mostly PET (polyethylene terephthalate) recycled from plastic bottles. I cut the plastic bottles into different shapes, then, a very low temperature treatment turns these flat foil-like elements into volumetric sculptural shapes. As PET is a material that cannot withstand high-temperature processes, all assembly is done on cold connections such as rivets or stitches.

Furthermore, in my workshop I am conducting an exercise with my students. Each of them is developing jewellery pieces out from computers, CD, plastic shopping bags, shampoo flasks,

dairy containers, etc. It is unbelievable the quality and novelty in jewellery we are managing! Hopefully we will be showing next November 2013.

6. In my own collections I've been using mostly PET.

7. It is a great challenge to make a jewel out of waste. Experimentation is cheap as there is so much material available and the results can be highly rewarding.

8. Absolutely YES. But they have to take the chance to very time consuming experimentation.

9. We need to take actions on our environment and reduce waste. It is not that reusing a couple of bottles will solve the problem of waste in our world. It is that we, as community should think on less consumerism, or at least in the way articles are commercialized and packed.

10. Creativity and unexpected use of waste materials can help people to focus on the existence of them, otherwise thinking where are they going when not applied in art pieces.

11. Perhaps making them think ways of transforming it or taking to a minimum it existence, if possible.

12. I think consciousness on this issue is growing steadily and in the future it will be a regular practice, not something out of common.

13. Yes. I have in mind and storing nice leftovers of paper and cardboard that I am planning to apply to another project.

14. Thank you for the opportunity you are offering me. It is very fulfilling to see an idea like this spreading around.

Interview (2013-06-17), with the **Sonya Sanchez Arias** from USA, via email

1. My name is Sonya Sanchez Arias - I am a Professional Photographer, Photo stylist and Photo Art Director and Recycled Artist.

Photography Site- Sanchez Arias Photography (http://SanchezAriasPhotography.com)

Beauty (http://SanchezAriasPhotography.com/beauty/)

Recycled Art, Reclaimed beauty jewelry (http://SonyaSanchezArias.com)

2. Sonya Sanchez Arias creates one of a kind limited edition 'Eco-Friendly' jewelry. The artist has gained recognition for her Recycled Art both nationally and in the Caribbean.

Her paper dresses, and her new line of jewelry showcase her interests in the natural organic beauty of nature and the transformative possibilities of discarded synthetic materials. Sonya is a successful photographic stylist, commercial photographer, and photographic art director for more than 20 years, transforming that which others see as commonplace into the extraordinary.

Born and raised on the cosmopolitan and bustling Caribbean nation of Trinidad and Tobago, she graduated from RIT with a BFA and currently lives and works in Boca Raton, Florida, surrounded by the diverse culture of Florida's trendy and multicultural East Coast. She credits her earliest influence to her mother's creativity as an artist and costume maker who worked for many years with the renowned artist Peter Minshall.

Her jewelry art follows the "up-cycling" movement which reevaluates the worth of waste by reclaiming and reinterpreting the beauty of discarded materials in new and unexpected ways. All of Sonya's jewelry and accessories are handmade one-of-a-kind pieces, the recycled materials that she manipulates gives the jewelry and accessories a strong identity with unique characteristics effectively making each piece a distinct work of art.

3. There is beauty and usefulness in all things. So much energy, design and creativity is invested in all the materials that we use in our day to day lives. I've always used scraps and odds and ends to create my personal work; the whole process of transforming discarded materials into jewelry has always struck me as magical and gratifying. And over the years, that magical process has sent me on a journey of discovery.

4. All 3....I'm constantly exposed to traditional jewelry for the commercial market as part of my work with my husband creating commercial photography for the jewelry industry.

Because of the sheer amount of traditional jewelry that we constantly work with, I've gravitated to a more avant garde style of jewelry that is crafted in the workshops of artists, the creators of the experimental jewelry.

I am more interested in exploring and discovering a new form of intellectual and alternate material based solutions. I am attracted to artists who are building foundations for the modern and progressive thinking for jewelry as a contemporary art form.

I'm always inspired by Mother Nature, the most impressive artist of all. I love organic shapes and textures and the incredible colour palette that nature provides. I was born on the beautiful Caribbean nation of Trinidad and Tobago, and I'm always influenced by the natural beauty, colour, culture and vibe of the island.When I create new pieces, I let the materials and their attributes when manipulated, inspire my designs.

5. Empty PET Water Bottle, Plastic Utensils and containers, Rubber Tubing, Electrical Wires or Plastic Bags, Paper, Trash and Plastics washed up on the beach....there's an endless supply of materials.

I use many different techniques; it all depends on the attributes of the materials. I create from the inside out. Though I work quite deliberately, consciously exploring the attributes of my materials, addressing their limitations and creating innovative techniques by which I can manipulate them, my unconscious carries me across the barriers into new and uncharted possibilities.

6. Plastics and paper.....before I began making my recycled jewelry...I started out making paper dresses. I began making jewelry because I was running out of space. My work space is divided between my Commercial Photography and my recycled art, so it just made sense to go smaller, especially while experimenting with new processes.

Eventually, I'd very much like to do much larger installations.

Paper Dresses- http://SanchezAriasPhotography.com/portfolios/personal-work/paperdresses/

7. My process and my inspiration are material-focused. Using non organic discarded materials and reworking them to create unexpectedly organic shapes and patterns. I aim to create Jewelry and Accessories that force you to look at the ordinary in a new in an extraordinary way. I have always felt the need to bring attention to the beauty and purpose of all things. So much energy, design and creativity go into all the materials that we use in our day to day lives….yet so

many of them are just ‘tossed out’ once their contents are emptied and their ‘perceived’ value has been served.

8. I have always used scraps and odds and ends to create my personal work, the whole process of transforming discarded materials into something useful has always struck me as magical and gratifying. And over the years, that magical process has sent me on a journey of discovery, leading me to this intriguing and useful new form of art. Creating my Jewelry and Accessories out of discarded materials fills me with a sense of purpose, accomplishment and integrity and has become the perfect vehicle for translating my inner vision into an outer reality. When people look at my jewelry they are always amazed when I tell them what they are made from.

9. If my work has a mission, it is this: To see the beauty and potential of all things, and the possibilities that a different point of view can create. It may be an empty water bottle, plastic utensils, rubber tubing, electrical wires or plastic bags. Whatever the material or the original purpose, it can be transformed into something new and unexpected with a new reason for existing.

10. I think most of us realize the importance of working toward sustainable development and sustainable solutions. In an over-consuming society, already struggling to solve the problems of tomorrow, eco-design and eco-art offers a new path to more environmentally friendly products, by up-cycling and repurposing discarded materials into useful art.

11. Just because something is recycled doesn’t mean it’s trash and it certainly doesn’t mean it cheap. Good taste has nothing to do with money or how much we spend on materials. Spend more time with your kid; get them involved in recycling, reinventing and repurposing discarded materials. This is their planet…we just borrow it from them for a while. Teaching our children the importance of living green, sharing and spreading the idea of Recycling and Repurposing is the best gift you could ever give them.

12. Eventually it’s no longer going to be a choice. We must find a way or reuse, recycle, and repurpose materials and find sustainable and eco-friendly solutions.

13. Absolutely - there’s a never ending supply of materials for me to work with, my Recycled Art is therapy for me, it is a way for me to make sense of the total disregard and unconscious way in which we dispose of perfectly good items that we feel have served their

purpose. By manipulating these discarded materials, I can reinvent their usefulness and reclaim their beauty in a totally new and unexpected way.

14. I never set out to be an environmental artist or to create artwork relating to social commentary, I make my jewelry purely because I need to…..I must find a way to express my creativity. None of it was intentional – it all developed and evolved over time. I've never found it easy to explain my work – when I make something that's just how I want it to be – I'd like my work to speak for itself and whatever it says to the viewer – will be the right message - Art is subjective and there isn't a wrong or a right message. Hopefully each person will see the work differently and connect with it in their own way and I'd be totally satisfied with that.

Good luck with your project -sending you green lights all the way!

5.5

Appendix D:

Focus Group Schedule

Introduction (1 minute)

Hello. My name is Lina Bitkeviciute. I'm going to lead our discussion today. I'd like to start off by thanking each of you for taking time to come today. We'll be here for about an hour and a half.

The reason we're here today is to get your opinions and attitudes about issues related to plastic waste creates serious environmental problems especially with a modern living consumption and a low recycling rate.

Discussion will be recorded for research purpose only.

Ground rules (2 minutes)

To allow our conversation to flow more freely, I'd like to go over some ground rules.

1. Everyone doesn't have to answer every single question, but I'd like to hear from each of you today as the discussion progresses.
2. This is a confidential discussion in that I will not report your names or who said what to the college. Names of participants will not even be included in the final report about this meeting. It also means that, except for the report that will be written, what is said in this room stays in this room.
3. I want all of you to feel free to comment on each other's remarks without fear that your comments will be repeated later and possible taken out of context.
4. There are no "wrong answers," just different opinions. Say what is true for you, even if you're the only one who feels that way. Don't let the group sway you. But if you do change your mind, just let me know.
5. Let me know if you need a break.

Introduction of participants (10 minutes)

Before we start, I'd like to know a little about each of you. Please tell me:

• Your name…

General questions (10 minutes)

Specific questions (30 minutes)

Closing question (10 minutes)

Closing (2 minutes)

Thanks for coming today and talking about these issues. Your comments have given me lots of different ways to see this issue. I thank you for your time.

Appendix E:

Selected emails

STUDENT RESEARCH PROJECT

Informed consent letter

Title

"Eco-conscious Message in a Bottle", second title: "Post consumer PET plastic bottles upcycling into Jewellery design in Porto context"

Principal investigator and contact information:

Student: Lina Bitkeviciute lina_bitkeviciute@yahoo.com

Supervisor: Susana Barreto susanaxbarreto@gmail.com

Student researcher's name:

Lina Bitkeviciute, Specialty in Image Design, Faculty of Fine Arts University of Porto, based in Porto, Portugal. Class of 2011-2013.

(http://sigarra.up.pt/fbaup/pt/fest_geral.cursos_list?pv_num_unico=201104795)

Purpose of your study:

I am a master student in Faculty of Fine Arts. This semester, I am conducting a research project. I am working closely with my supervisor, Dr. Susana Barreto, who will be the main contact person for this project. I would like to know if you would be willing to take part in a research study.

Procedures:

You will be asked to answer an email questionnaire.

Note about voluntary nature of participation and statement about compensation:

Your participation is voluntary. You may refuse to participate or may discontinue your participation at any.

I look forward to hearing from you.

Best regards,

Lina Bitkeviciute

U.PORTO

FACULDADE DE BELAS ARTES
UNIVERSIDADE DO PORTO